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THE
THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

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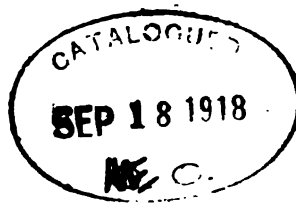
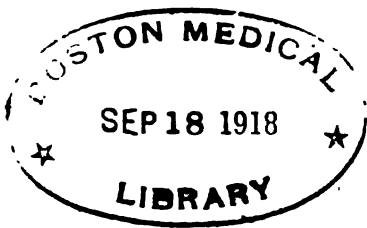
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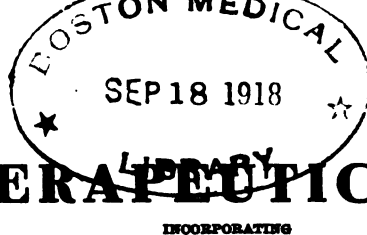
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ORIGINAL COMMUNICATIONS.

SUBACROMIAL BURSTITIS.

BY JAMES K. YOUNG, M.D., F.A.C.S.,

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Of the large number of shoulder disabilities, by far the most frequent one is subacromial bursitis. Moreover this is an affection not frequently diagnosed by the practitioner. While this condition has been recognized for a long time, and clear clinical descriptions of it have been announced by Duplay, Putnam, Graham, and Küster, the best clinical and descriptive data have been given by Brickner and by Codman; and to the latter's articles on the subject I am indebted for some of the statements contained in the present article. As supplementary to these facts I have added my own observations, extending over a period of years, and including a large number of such clinical cases.

Anatomy.—The largest bursa about the shoulder-joint is the subacromial or subdeltoid bursa, situated between the upper portion of the capsule, the coracoacromial ligament, and the acromion, and extending downward beneath the deltoid muscle. Its apex is intimately united to the top of the humeral tuberosity and the tendinous expansion of the supraspinatus muscle, while its base is firmly attached to the under side of the acromion and the coracobrachial ligament. It is the loose periphery of the bursa which is movable, and which rolling on itself allows the roof to slide to the base. The size of the bursa, according to different writers, varies within wide range; but it may be set down as a safe statement that the bursa as a rule is about two and one-half inches in diameter.

The subacromial bursa does not usually communicate with the joint. When the bursa is the seat of inflammation the deltoid, which is one of the abductors of the arm, relaxes so that rotation or upward pressure is painless. When disease attacks the subacromial bursa, abduction and upward pressure occasion marked pain because the sac is squeezed against the humeral head, on the one hand, and the lower



FIG. 1.—Subacute bursitis, inflammatory type.

surface of the acromion and the coracoacromial ligament on the other.

Pathology.—Following an injury to the subacromial bursa there is an inflammatory reaction, resulting in an oversecretion, and this is followed by plastic adhesion and a

thickening of the capsule. These adhesions are not only situated within the bursa, but are also on the exterior of the capsule, producing an adhesion between the bursa and the surrounding structures. The tendon of the supraspinatus at its attachment to the greater tuberosity of the humerus is often partially or completely torn.



FIG. 2.—Chronic bursitis, showing deposit in the supraspinatus muscle.

This injury is manifested by a depression over the seat of the rupture, or by the occurrence of a frayed-out appearance of the

usually found beneath the bursa, as pointed out by Brickner, "in or on, and in and on the supraspinatus tendon (Fig. 2), or occasionally the infraspinatus, near its insertion." It has been suggested that the lesion in the bursa may be of toxic or bacterial origin, but this has never been substantiated by pathological evidences. Tuberculosis of the bursa may occur, and Cor of Baltimore has reported an interesting study of infection through the agency of the gas bacillus.

As a result of the swelling of the bursa there is a prominence over the shoulder beneath the acromion process, and later this is replaced by a flattening of the shoulder due to muscular atrophy.

Symptomatology—According to the symptoms, two distinct forms may be recognized: an acute or spasmodic form and a subacute or adherent form (Fig. 1). A third variety is described by Codman under the name chronic or the non-adherent form (Fig. 2).

Diagnosis.—This affection is characterized by a localized tenderness and swelling at the tip of the shoulder just below the acromion process. Abduction and external rotation are both limited. The scapula is locked by spasm, and after ten degrees of rotation have been obtained the scapula moves with the arm. There is pain at the point of the shoulder, sometimes extending down into the hand, and pain is sometimes referred to the point of insertion of the deltoid tendon. Fluctuation at times can be detected below the tip of the acromion and upon deep palpation. Swelling

Acute.*	Subacute.	Chronic.
1. Local tenderness.	1. Tenderness may or may not be present.	1. Tenderness often absent.
2. Abduction of the arm followed by disappearance of the tender point (Dawbarn's sign).	2. Dawbarn's sign absent.	2. Dawbarn's sign present; tenderness is present.
3. Spasm.	3. Limitation of abduction and external rotation.	3. Abduction and external rotation with slight limitation.
4. Cannot raise the arm unaided without pain.	4. Scapula accompanies humerus.	4. Scapula does not accompany movements of the humerus.
5. Pain extending to hand.	5. Pain, same as in Type No. 1 (the acute form).	5. Pain, especially after
6. Swelling over the shoulder.	6. Cannot extend the elbow.	

tendon at the insertion of the supraspinatus muscle.

Calcareous deposits are not frequently encountered within the sac itself, but are

ing of the subacromial bursa may at times be detected and demonstrated by means of the Roentgen ray; not so much from thickening of the walls as from the globular, clear space over the site of

*These tabulated lists are modified after Codman.

bursa and the fulness of the structures overlying the bursa as compared with the opposite side. Calcareous deposits beneath the bursa and at the attachment of the tendon of the supraspinatus, or beneath it, can readily be demonstrated by resort to the x-rays.

Differential Diagnosis.—Subacromial bursitis must be carefully distinguished from the following conditions:

Fractures of the tuberosity and of the anatomical and surgical neck of the humerus. These injuries are always accompanied by ecchymoses, early or late. There is swelling of the inner side of the arm. The presence of fracture can always be verified by the Roentgen rays. But when this is not accessible the cardinal symptoms of fracture assert themselves: mobility, crepitus, disability, and discoloration. The fracture most difficult of diagnosis, without the assistance of the rays, is the one that occurs in the same manner as injury to the subacromial bursa, as by falling on the fully extended hand; the fracture thus occurring is fracture of the lesser tuberosity of the humerus. This may also be diagnosed without the rays, by finding localized tenderness over the lesser tuberosity, which is followed in twenty-four hours by ecchymoses extending downward along the biceps muscle and tendon to the elbow.

Inflammation of the sheath of the biceps tendon. This produces symptoms closely simulating inflammation of the subacromial bursa. Some of the injured arms in ball players are of this character. There is localized tenderness along the course of the long head of the biceps, pain in the abductors and external rotator muscles. Pain especially in the beginning of abduction would suggest inflammation of the sheath of this tendon; pain being more frequently present in inflammation of the subacromial bursa in abduction beyond ten degrees.

Circumflex paralysis. Many cases of bursitis are incorrectly diagnosed as cases of circumflex paralysis. In circumflex paralysis there is inability to raise the arm and marked atrophy, and the paralysis may be verified by electrical tests. A simple

clinical test would be in the voluntary effort of the patient to elevate the shoulder, when in case of circumflex paralysis there would be complete absence of muscular contraction beneath the palpating fingers.

Chronic arthritis. Of chronic arthritic conditions encountered in the shoulder-joint, the most common form is traumatic arthritis, due to injury of the shoulder in an individual who has an underlying infectious or toxic condition. The symptoms are tenderness over the great tuberosity and in the axilla, more or less complete loss of motion, some induration about the joint, and a "grating" or crepitus on motion.

Tuberculosis of the head of the humerus. The differential diagnosis of this affection from subacromial bursitis is difficult, because the bursa not infrequently becomes later infected with tuberculosis. In the earlier stages of tuberculosis there is local pain over the head of the bone, flattening of the deltoid, fixation of the joint by muscular spasm at first, and later by ankylosis, true or false. There is always a lesion associated in some other part of the body. The x-ray is the only possible means of making a correct diagnosis of the site and extent of the tuberculous disease. Abscesses form late in the affection; these are never present in subacromial bursitis.

Acromioclavicular arthritis. In this condition it is difficult to make a differential diagnosis where ankylosis has occurred and has been broken by traumatism. This has been observed by the writer, and the diagnosis corroborated by the Roentgen rays.

Prognosis.—The condition is much improved by an early and a correct diagnosis and operative treatment, since prolonged fixation frequently delays recovery. Patients often apply too late for efficient treatment. The prognosis where efficient treatment is instituted and where the operation has been performed is excellent. It has been suggested that since many of the patients suffering with subacromial bursitis recover without operation, by means of baking, electric-light baths, massage, etc., restoration to normal is not hastened by operation. But this has not been the experience of the

writer. Operation should first be performed, and subsequent efficient treatment will be followed by recovery.

TREATMENT.

Little benefit is to be expected from the application of local counter-irritants. Some benefit may result from relaxing the shoulder, and resting the arms on a pillow placed on a table, so as to relax the deltoid muscle. It is always unwise to fix the shoulder either by means of a bandage or a plaster dressing. The greatest benefit will be derived from an operation, which consists in opening the sac and draining it. This is known as the Codman operation, and is as follows:

General anesthesia is used, and the patient is placed in the dorsal position. The arm is flexed at a right angle, and the humerus is placed at the side, midway between internal and external rotation. The incision is made through the skin, from the top of the acromion process downward, two inches, the line of incision being over the external lip of the bicipital groove. The fibers of the deltoid muscle are separated, as in laparotomy. The cellular tissue beneath the muscle is lifted between two pairs of forceps and carefully incised. The serous lining of the bursa is first nicked and then enlarged upward and downward, the edges being clamped on each side. These clamps serve as retractors, while the humerus is rotated from side to side, exposing the interior of the sac. The inferior surface should always be inspected for deposits in the tendon of the supraspinatus muscle. If any of these deposits be found they should be carefully removed. Fibrous bands within the interior of the capsule should be divided with scissors or knife.

It is not usually necessary to curette the interior. Neither the sac nor the deltoid muscle should be closed with sutures; but the skin should be closed with silkworm-gut sutures. The contents of the sac are allowed to escape in the surrounding tissues. The arm should be suspended by the wrist to the head of the bed for one week, unless the position becomes intolerable, after which the arm should be carried in a sling for a period of three weeks. The after-treatment should be begun with hot-air baking, massage, and manipulation. The manipulation consists in full and painless abduction of the arm performed by an assistant. The operator also rotates the humerus internally and externally. If the patient will not remain in bed, an abduction plaster splint may be applied to support the arm.

Excision of the subacromial bursa is an exceedingly difficult operation, and its performance is almost impossible under certain circumstances. Where the sac is clearly defined by inflammatory contents and sclerosis it may be possible to excise it. But in the usual clinical forms (described in this paper) incision and drainage are all that are necessary. As to the after-treatment: Four weeks after the operation the patient, having the arm extended upward for one week, and then for a period of three weeks carrying it suspended in a sling, is to have the part manipulated by means of massage and baking in order to hasten recovery.

Full and free movement of the shoulder may be finally accomplished by gentle manipulation; these manipulations, however, are not to be carried at any time beyond the point of tolerance of pain.

222 SOUTH SIXTEENTH STREET.



CARDIAC SYPHILIS.

BY THOMAS E. SATTERTHWAITE, LL.D., Sc.D., M.D., New York.

Ricord, in 1856, was the first to give a definite description of cardiac syphilis, though its existence had long been known. Some four years later Virchow also wrote of it, while Lancereaux in 1866 classified it under four types.

Up to this time, however, the gummy tumor was the only criterion on which to base a diagnosis of the visceral disease, so far as the naked eye was concerned, although, like fibrous phthisis, it was known to be characterized by fibroid infiltration. Even as late as 1886 so keen an observer as Fagge had made the diagnosis in only four instances, though he had exceptional opportunities for seeing the various lesions of heart disease in the pathological department of Guy's Hospital during a long service there. His criteria were gummy tumor in one case and fibroid disease in three, so that his findings would not now have great weight, because fibrosis of the heart may be due also to rheumatism and other causes. Tuberculosis seldom attacks the heart walls, though it not infrequently invades the pericardium, more especially its external layers.

The frequency of cardiac syphilis was later indicated by the researches of Mracek and Kundrat of Vienna. They collected from the literature and their own experience 102 cases, based on the criteria of that day, and classified them as follows:

Myocarditis, gummatous	10
" fibrous	9
" gummatous and fibrous.....	2
Endocarditis	8
Pericarditis	1
Diseases of vessels.....	3
Myocarditis with or without endocarditis....	15
Peri- and endocarditis.....	1
Diseases of myocardial vessels and myocardi-	
tis	1
Diseases of ganglia, etc.....	11
—	61

Though gummas were found in as many as 27, or about 44 per cent, it must not therefore be concluded that this figure represents the comparative incidence of the gumma in syphilis. They were basing their diagnosis of the disease largely on the occurrence of the gummy tumor, and, to a

less degree, on such other collateral evidence as was at hand. Gummy tumors are not really as common as these figures would imply, and they only occur in the late stages of the disease. But these statistics point to the fact, which has been confirmed by the known habitats of the *spirocheta pallida*, or *treponema pallidum*, discovered by Schandinn and Hoffmann in 1905, that the disease may invade any part of the heart or its coverings, and also the vessels adjacent to it. Thus far we have been in the habit of believing that the disease begins in the vessels or in the perivascular tissues, causing fibrosis in these situations, and, corresponding to the vascular network, a progressive induration of interstitial tissue in the organ. Such changes I noted as early as 1891, when, in an article on pulmonary syphilis, I stated that in this disease we may sometimes find naked-eye appearances like those of miliary tuberculosis; at other times, in presumably advanced stages of the miliary development, a peculiar fibroid induration, which I held to be the most common of the lesions of the disease, with associated clinical signs that had a certain degree of positiveness about them. I still hold to this view. At first the indurated tissue has a pellucid bluish appearance; later it becomes white and glistening, while a later development is the characteristic gummy tumor, whose appearance and characteristics are well known to us. These tumors I found chiefly in the middle or lower lobes of the lungs, the liver, or the kidneys. The same sort of gummy tumor occurs in the heart or its membranes.

At the same time I stated that in the progress of the disease there was the same tendency to thickening and degeneration of vessels, implication of lymphatics, and production of fibroid tissue, as in fibroid tuberculosis. Indeed, before the bacillus tuberculosis and the *spirocheta* had been discovered, there seemed to be no way of distinguishing between these miliary formations. In so far as the larger vessels are concerned, Dr. W. H. Porter of this city

had previously found them sometimes the seat of hyaline changes, and his views had been accepted by two of our most prominent pathologists. Two years later the implication of the vessels, both large and small, was described *in extenso* by the late Dr. Leonard Weber of this city.

In this connection it is worthy of notice that the aorta is the subject of an affection first described by Döhle in 1885, and called by Chiári mesoaortitis. It has quite recently enlisted a good deal of attention. Richter, describing it as an inflammation of the middle coat of the aorta, situated usually about one and a half inches above the semilunar valves, says:

"The valves are usually not involved, but the coronary arteries frequently suffer from secondary conditions resulting from aortic changes, from retractions and partial occlusion, to which an obliterating arteritis of the coronary vessels may be added. Deep scars result, star-shaped, with a thinned wall offering lessened resistance to blood-pressure and giving rise to aneurism. Or, in other cases, flat plaques, slightly raised, with fine folds covering the surface, or thick fibrous patches are seen. They may extend down to the thoracic aorta; often they remain isolated and small. They are quite characteristic, since the endothelium is not directly involved; occur with preference in younger persons, and cannot be mistaken for arteriosclerotic processes. The mesoaortitis syphilitica may be further characterized by the presence of gummata. In purely syphilitic cases the intima is *never* implicated primarily in the process."

Longcope has found from his experience in a large number of instances that the disease is usually slow, averaging sixteen or seventeen years.

More recently our attention has been called by Warthin to the occurrence of parenchymatous changes in syphilis, as well as the interstitial variety, and as a result of its harboring the spirocheta. His pathological studies have led him to hold the view that cloudy swellings of the solid tissues, degeneration, atrophy and necrosis can be the result of localization of the specific

germs in the parenchyma, producing parenchymatous changes that are quite independent of the interstitial or fibroid that have been described.

But hereditary as well as acquired lues may affect the heart. Mracek found it four times in 150 autopsies of infants. Fischer never saw but one case in a large experience. Waldstein up to 1905 had never seen a single case in the Babies' Hospital of this city. Buschke and Fischer found the blood and tissues of the viscera, including the heart, infiltrated with the spirochetæ in an infant three weeks old, the disease being congenital, of course.

As one might suppose, the gumma is more common in the male sex, and usually occurs between the ages of twenty and forty. It varies in size, and is usually found in the ventricles, but may be found in the auricles, septa, or papillary muscles, or, in fact, anywhere in the heart. It is usually multiple, and the nodules, as we commonly recognize them, are from the size of a pea upward. It may dissolve and break down, and discharge into the cavities of the heart or outside of it, causing a cardiac aneurism. If cicatrization follows a gumma, there will be atrophy of muscle fibers in the adjacent territory; and if there is a general sclerosis extending from the thickened vessels, there will be general atrophy of the muscle. If the gumma is near the periphery of the organ, the sclerosis will extend toward the surface, and may leave a point of thickening. In the same way valvular deformities may be produced by the deposit of a gumma in the valve. Its dissolution, with subsequent puckering, from loss of substance in the valve, or a defect due to a gumma in a tendinous cord or papillary muscle, may cause distortion of the valve and incompetence or obstruction, or both. In any case, whether in the heart or adjacent vessels, its disappearance is apt to be marked by a scar with puckering of the tissues, usually stellate, often yellow-stained, that to the trained eye indicates with a very fair degree of certainty its luetic character.

Though the gumma at first is of a pearly-gray color, and enclosed in a pretty firm

fibrous capsule, if hemorrhage ensues it becomes red, and later yellowish, provided it undergoes change or breaks down and discharges. Under these circumstances the central material is fatty or sticky, the latter when it undergoes a mucoid rather than a fatty change. It is this mucoid substance which sticks to the fingers and gives its name to the gummy tumor.

But whatever the change is—that is, whether it undergoes absorption or discharges its contents—the capsule contracts, hardens, and assumes a whitish color; and if the material has been discharged from the center it leaves a depression, looking like a depressed cicatrix, from which bands of fibrous tissue radiate outward. The center is apt to be stained a yellow color. In general these peculiar changes depend on larger or smaller gummy tumors, originating along the line of the vessels and spreading throughout the organ.

It follows from all this that such tumors or even aneurisms are apt to be multiple; but, as already said, the difficulty of recognizing any syphilitic lesion, except the gummy tumor or the fibroid infiltration immediately connected with it, is very great, so that endocarditis, pericarditis, or myocarditis occurring in syphilis, and as seen at autopsies, is likely to be attributed to something other than lues.

As the close connection between this disease and the blood-vessels is an established fact, in well-advanced heart syphilis we naturally expect to find sclerosis of the coronary arteries. And yet we should not therefore impute all coronary disease to syphilis, though, as the heart is a favorite nidus for the specific germ (Warthin, *Jour. of the Amer. Med. Assoc.*, March 9, 1912), it is more likely to cause coronary sclerosis in syphilis than anything else. Syphilis is not, however, the most common cause of arteriosclerosis.

A diagnosis at the present day should be based upon a previous history of syphilis, often in a patient who has been treated by the regulation methods of former times, with mercurials and the iodides, until no visible, palpable, or subjective signs of the

disease have remained. In fact, it may have lain dormant ten, twenty, or even thirty years (Richter, *loc. cit.*). The most distinctive diagnostic signs are arteriosclerosis; a weak, arrhythmic pulse, frequent or infrequent; dilated heart, angina, aortic dilatation, or aneurism; valvular disease, usually aortic; finally, the Wassermann or other luetic reaction.

Babcock has found that most cases of aortic regurgitation of the vascular type, as distinguished from the endocardial, are to be regarded as syphilitic.

The late Huchard held that angina was one of the most important signs; in the second stage it was of the false type, in the third of the true type.

But the results of therapeutics afford most valuable aid in diagnosis. Some years ago I had under my care a physician of New York, past middle life, who gave no subjective or objective signs of syphilis, but who had suffered from chronic cerebral pains in connection with his cardiac disease. A thorough course of mercurials and iodides, together with Nauheim baths and exercises, put him on his feet, and he is now, or was at last accounts, actively at work.

In this latter respect I find I am quite in agreement with Brooks and Carroll. According to their conclusions from an analysis of 200 cases, cardiac symptoms appear in most cases of syphilis. Though they may appear in the second stage, they usually are not discovered until the third stage. To quote these writers: "The signs differ from those of idiopathic or simple cardiac cases in a greater tendency toward the involvement of the heart muscle and the coronaries. Precordial pain is probably the most constant symptom, and among the earliest. This is often definitely anginal. Cyanosis, dyspnea, and other signs of cardiac incompetence are usually present long before true incompetence is evident. The greater number of cases show combined aortic and mitral lesions, in the way of endocardial involvement. Recognition depends primarily on the diagnosis of lues and the association of a cardiac defect, either of a

definite or supposititious nature. Wassermann reaction, etc., finds its place in the diagnosis of the primary lues, but the most conclusive and important diagnostic test is the therapeutic one."

So far as the Wassermann reaction is concerned, Babcock found it accurate in 15 out of 16 cases, or 93.7 per cent. There is of course an element of uncertainty about it. It has been found to fail in 50 per cent of the cases of latent syphilis, in *tabes dorsalis* and alcoholism, or when the condition is masked by antiluetic treatment. At the same time, he holds, a positive Wassermann may be found in cases of recent malaria, yaws, or leprosy. In these doubtful cases it may be necessary to do lumbar puncture, and examine the cerebrospinal fluid as well as the blood. Excepting under these unusual circumstances the Wassermann seems to be reliable. And yet the therapeutic test alluded to is hardly less valuable; for in latent cases, after a thorough course of mercurials and iodides for the later stages and salvarsan for the earlier ones, the relief of the luetic symptoms is so pronounced as to seem little less than miraculous. And it is quite comprehensible, now that we know not only that the heart muscle is the favorite seat for the colonization of the specific germs, but that they are said to collect there early in the second stage of the disease.

The discovery of the *spirocheta pallida* has not only revolutionized our previous knowledge of syphilis, but has made our diagnosis, prognosis, and treatment more effective. Not only is syphilis a more common disease than was suspected, but in a certain number of cases it is the actual cause of death from heart implication. Cabot, in a total of 562 cases of heart failure reported by him, has attributed 74, or about 13 per cent, to syphilis. Breitmänn, Mracek, and Julien have made it 33 to 50 per cent, after strenuous exertion, bicycling, hot or cold baths, excesses in wine or venery, even after forced defecation. It is to be noted that these statements correspond with the contention that the disease is less dangerous here than

abroad. Runeberg's statistics indicate this; he found that in the experience of a single life insurance company, out of 734 deaths at least 84, or about 11 per cent, were of persons who had contracted syphilis. Twenty-two of these deaths were attributed to progressive paralysis, and 33 to disease of the central circulatory system (the heart and aorta), 24 of the latter dying of syncope; so that the danger of death from a syphilitic heart or aorta appeared to be greater than from syphilitic disease of the central nervous system, and sudden death was the result. In looking over my private cardiac cases, some years ago, I found that syphilis was positively present in about 5 per cent, and probably present in another 5 per cent; the inference being that in cardiac disease we should suspect that syphilis is a factor in at least 10 per cent of the cases.

The prognosis is bad, but not altogether so. If the diagnosis can be made early, and the proper treatment instituted and maintained wherever any indication of the disease is apparent, some success may be expected. Even in advanced cases, where, for example, there is *tabes dorsalis*, improvement can sometimes be effected. Yet notwithstanding that we may be able to remove the deposits by medicine, usually a something will remain, so that if the part resumes its physiological activity, it still may not be sound pathologically.

Cardiac syphilis is more common than has been supposed. Like syphilis of the lungs, it exists, and the physician who fails to appreciate either of them falls short of his duties as a practitioner of medicine. In fact, neither heart nor lungs should be examined without always holding in view the possibility of syphilis as the cause of the disease. Where it may not be possible to make a positive diagnosis, a probable one can be reached. Appropriate treatment will confirm it. Cardiac syphilis is an insidious disease, and its manifestations are neither pronounced nor distinctive. A cure may be possible, while relief is probable, if the lesion is not too far advanced. If in such cases the physician fails to recognize the existence of syphilis, he should not be sur-

prised if his patient is carried off without warning, by sudden heart failure.

Treatment consists in the use of salvarsan, the iodides, and mercurials, and if there has been a positive Wassermann it should be continued until a negative is obtained. Afterwards the treatment should be along the line of therapeusis in other cardiac affections. It must, however, be borne in mind that there are some dangers connected with the use of salvarsan, especially if injected intravenously. This was early pointed out by Ehrlich, and has subsequently been emphasized by Babcock and Daland. So far as personal experience is concerned, I hold that as a rule mercury should precede the iodides, or at least it should form a part of the treatment.

I usually begin with the biniodide of mercury, in 1/16-grain doses, and continue it until the gums show the effect of the mercury. For external use I prefer the oleate of mercury, in strength of from 5 to 10 per cent. After the system has been made to feel the effect of the mercury, I begin with the saturated solution of the iodides, using at first the iodide of sodium and then the potassium salt, until the urine shows iodine, and the characteristic effects of the iodides are indicated by running at the nose, a coppery or salty taste in the mouth, and relaxation of the bowels. In the cases I have seen it has not been necessary, as a rule, to use the enormous doses I have given in cerebral syphilis. But if necessary, I should not hesitate to give the iodides in doses up to six drachms per day, as is sometimes the way in Europe. When I have given iodine internally in tablets with nuclein, I have not been obliged to exceed six grains per day. In very exceptional cases, in which treatment by salvarsan, mercurials, and the iodides is not effectual, I should not hesitate to use Zittmann's decoction; I have known it to be successful under such circumstances.

Brooks and Carroll, after studying three hundred cases, the largest number that has thus far been analyzed, came to the following conclusions:

"1. Cases of heart involvement in early

syphilis may be fully cured irrespective of the character of the lesion by vigorous specific treatment alone and independent of circulatory measures.

"2. Even well-established and late cases usually respond to treatment with cure, or marked though perhaps temporary benefit.

"3. In most tertiary instances purely circulatory measures produce but slight benefit unless preceded by or combined with specific medication.

"4. Interrupted or inefficient treatment establishes an immunity or resistance on the part of the lesions against the specific drugs employed. Hence the importance of vigorous and carefully systematized treatment.

"5. The most satisfactory treatment is one which combines the use of salvarsan with mercury and the iodides. Combined treatment *may* be unnecessary in early cases, but is essential in late ones.

"6. Salvarsan, preferably old salvarsan, produces in most instances the quicker results. It is capable, however, of inducing serious symptoms, and in untried cases of heart involvement it should be administered in small doses until its action has been ascertained, particularly in those lesions characterized by disturbances of rhythm.

"7. Mercury alone may produce apparent cure. Best effects are secured with this drug when its form is from time to time changed. Its use appears to be indispensable in all well-established cases.

"8. The iodides are valuable adjuvants in the treatment of these cases, especially in their late stages, but they are apparently without specific action.

"9. Permanent injury to the heart must be assumed to have taken place in late cases, even though prompt response to treatment and apparent cure occurs."

Finally, in any case of cardiac syphilis we should bear in mind that the heart is likely to be only one of several organs involved. For it is upon the internal organs—the lungs, liver, kidneys, and brain—that the disease is apt to spend itself, more particularly in the later stages.

It should also be fully realized that while

the duration of an attack may be brief under favoring circumstances, it may last for years, and, in fact, for the most of one's

life, during which time it will require constant supervision and unremitting attention if serious disasters are to be avoided.

REPORT OF A CASE OF TETANUS SUCCESSFULLY TREATED WITH ANTI-TETANIC SERUM.

BY FRANK BIRD, M.D., VALDOSTA, GA.

The object in reporting this case of tetanus is to reiterate my views and suggestions in a paper published in the THERAPEUTIC GAZETTE of January 15, 1916, entitled "Report of a Case of Tetanus," advocating larger doses of antitetanic serum.

The case that I am now reporting was the worst that I have ever seen, and the recovery was complete. I wish to make an effort to standardize the treatment. I consider antitetanic serum the best treatment as far as my experience goes (having never used the magnesium sulphate treatment), and when the antitetanic serum fails to cure it is probably due to the fact that the physician's fear of serum sickness, anaphylaxis, and other toxic reactions causes him to give a dose which is too small to be effective. This fear is of minor importance when we consider the desperate character of the disease, and my personal experience goes to show that if we apply the axiom "Desperate cases require desperate measures," we shall have the keystone to the treatment of tetanus.

Well-defined tetanus is a short-lived disease, and we have been in the habit of thinking when meeting it that the patient would probably die.

The following case is interesting in several respects. One of the first points is that small doses of antitetanic serum merely hold the disease in check by neutralizing some of the toxins; second, that untreated tetanus rapidly proves fatal; third, that large doses of serum check the disease absolutely and prove rapidly curative by combining with all the toxins already formed, and leaving enough antitoxin in the system to neutralize any toxins that may be formed later, thus causing an immunity.

December 14, 1915. Patient, J. S., aged eleven years, school-boy, living ten miles in the country, in perfect health up to the present attack.

First day. At noon-time he started to get on a horse, and he stepped backward, falling. He began to have muscular spasms of face and stiffening of the legs. I saw him an hour after the attack began. He was lying on a bench in the schoolroom, unconscious. He had been given an enema and bowels moved freely. The spasms of the muscles of the face indicated severe pain. The teeth were clenched and uncovered by the lips, the angles of the mouth being drawn backward. He was groaning. The abdominal muscles were tightly contracted. The right leg was somewhat stiff during the spasm, the left leg relaxed. The pulse-beat was normal in character, rhythm, and frequency, except during the attack, when it was increased. The body temperature was normal. I was unable to say what was the matter with him, as I had never seen any condition with a beginning as peculiar as this. However, I gave him morphine, grain one-eighth, by hypodermic injection, and left instructions to call me at seven o'clock and report his condition. I also requested that he be given a dose of castor oil some time during the afternoon if possible.

At seven o'clock I received a message to the effect that the patient was much worse, the spasms being more frequent, more severe, and lasting longer. They also said that the whole body was involved. I saw the patient one hour later and found this condition to be true, and immediately saw that I was dealing with a case of tetanus. The jaws were locked, the teeth clenched, and the spasms caused a contraction of all

the voluntary muscles of the body. However, the muscles of the left leg were not nearly so much involved as those of the right one. Upon questioning I learned that the boy had dropped a knife on his toe four nights previously. Examination showed a very slight skin abrasion covered by a healthy scab. When I arrived back in town I found I was able to obtain only three thousand units of antitetanic serum, as the stock had been taken up from the drug stores for exchange a few days before. However, I administered this amount by spinal puncture into the subarachnoid space, ten hours after the beginning of the attack. Chloral and sodium bromide were given per rectum for the sedative effect. A brother of the patient was instructed to go to a neighboring town the next morning in an automobile and get more serum while I telegraphed for a supply. He could obtain only six thousand units.

Second day. In the morning the patient showed some improvement. The spasms were shorter and not so severe. In the afternoon, however, his condition was about the same as it was the night before. The spasms were very severe and he was still unconscious. During the spasms there was trismus, frothing at the mouth, cyanosis, increased frequency but diminished volume of the pulse. A spinal puncture was made and some spinal fluid removed; then three thousand units of antitetanic serum were injected. Three thousand units were also given into the buttock of the right side in an effort to intercept some of the toxin on its way to the spinal cord.

Third day. There was apparently no improvement in condition regardless of the treatment given on the second day. At 10 A.M. he was in a state of almost continuous tonic spasm. The right leg was extended and stiff; it could be bent by manual force, but always elicited a new spasm, and from the facial expression during manipulation it must have caused great pain. Severe spasms came on every three to seven minutes. A towel was constantly needed to wipe away froth from his mouth. Pulse too rapid to count. During spasms the

whole body and face was convulsed, and the patient presented a terrible picture. The disease had been so severe that he could hardly be recognized as the same boy. The neck was stiff, and raising the head would inevitably excite another spasm. The lungs were filled with mucous râles, and there was gurgling in the throat.

The serum that had been telegraphed for arrived, but it seemed to me that it was useless to give it as I thought the boy would surely die. However, I injected twenty-six thousand units directly into the median basilic vein (having previously warmed it to body temperature), also four thousand units into the subarachnoid space, and three thousand units into each buttock. At this time the temperature was 104° per rectum. Camphor was given by hypodermic injection every four hours to stimulate the heart. Four hours after the injection of the thirty-six thousand units of antitoxin the patient was so greatly improved that it was hard to believe. The violent, convulsive spasms had entirely ceased. The neck and right leg were still rigid and jaws locked, but other muscles tonic. His temperature was 97.4°. He was still unconscious, but pulse and respiration were greatly improved. All frothing at mouth had stopped, but mucous râles were still audible in lungs. There was apparently no pain, except as evidenced by a feeble groan when a slight spasm came on.

Fourth day. In the morning he showed still more improvement. In the afternoon he began to talk deliriously about seeing snakes and crows and eating crow soup. He begged his father to keep the snakes off of him and to kill them. No sleep and no rest that day. Morphine, grain one-fourth, was given. No spasms and no trismus were present. Later on in the afternoon he was occasionally able to recognize members of his family. He moved his head about and focused his eyes upon imaginary objects in the room. The neck showed some stiffness when head was brought toward chest. As I believed that the delirium was caused by increased intracranial pressure I made a spinal puncture to relieve it, withdrawing

55 cubic centimeters of spinal fluid. I also injected 3000 units of concentrated antitetanic serum.

Fifth day. In the morning the patient recognized all members of his family, and was even able to take some water through a tube. The neck was still slightly stiff. Hallucinations were present occasionally.

Sixth day. No spasms. Sleeping most of the day.

From this time on the patient improved rapidly. He took liquid nourishment and slept most of the time. No pain present except from hypodermic injections of camphor. In a few days he was able to sit up, and later to walk around. He made an uneventful recovery, no trace of the terrible disease remaining.

No effort was made to feed patient through mouth or nose. Nutrient enemas were given throughout the course of the disease, some being retained and others expelled.

My conclusions from this case are practically the same as those drawn from the last case reported in the THERAPEUTIC GAZETTE, namely:

First, in all suspected cases of tetanus an immunizing dose of antitetanus serum (1500 units) should be given into the buttock. If tetanus has already begun it will surely develop further.

Second, trismus and spasms are sometimes the first definite indications of tetanus, coming on after a wound has practically healed, as in this case, but in about a third of the cases the first muscles to be involved or to show rigidity are those in the vicinity of the wound.

Third, any rigidity occurring in a part following a wound should excite suspicions of tetanus, and at least an immunizing dose of antitetanus serum should be given or treatment begun at once.

The condition tetanus is caused by the action on the nerves of toxins liberated by the tetanus bacilli, the most poisonous of these toxins being tetanospasmin. The purpose of treatment is not so much to destroy

the tetanus bacilli, but to neutralize its powerful toxins and destroy its union with the nervous system.

Fourth, bacteriological examination of discharges for purposes of diagnosis is a useless waste of valuable time. The symptoms and history are more reliable and save time. The incubation period varies according to the amount of toxin in the system and the individual susceptibility to this toxin. It is usually from two to five days.

Fifth, in the treatment of developed cases one large dose of antitetanic serum is more reliable and saves more time in the treatment and does a greater amount of good than several small ones frequently repeated. Consequently at least fifteen thousand to twenty-five thousand units should be given (warmed to blood temperature) into the blood stream under aseptic precautions for an adult dose, and three to nine thousand concentrated serum into the subarachnoid space. If a chill should occur following the injection (which is not the rule), give a hypodermic injection containing morphine grain one-fourth, with atropine grain one hundred and fiftieth. Nothing is so effectual as the above in stopping a chill. If no improvement in symptoms is noted in twenty-four hours, repeat the above dose. In cases further developed coming under observation with a history of repeated spasm, risus sardonicus, trismus, and the outlook poor, give five to fifteen thousand units concentrated antitetanic serum into the subarachnoid space and twenty-five to thirty-five thousand units into the blood stream at once, and repeat in twenty-four hours if indicated. Before giving the injection into the spinal canal allow about as much spinal fluid to flow out as the amount of serum which you intend to inject. This gets rid of some of the toxin as well as making space for the antitoxin.

Sixth, anaphylaxis appears to be less liable to develop after a single large dose than after repeated doses.

Seventh, fever is an uncertain symptom. It may or may not be present.

CLAW-FOOT OR CLAWED TOES.

BY ARTHUR J. DAVIDSON, M.D., PHILADELPHIA.

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One of the most distressing and crippling of all of the deformities that are seen in a large orthopedic clinic is that condition which is commonly known as claw-foot or clawed toes. The condition is practically that of multiple hammer-toe of a varying severity affecting several or all of the toes of one or both feet.

In the early and mild cases the toes merely assume a faulty position of dorsal flexion which is easily capable of full correction, but which position is habitually restored as soon as a corrective force or a voluntary effort is removed. There is an associated flattening of the anterior arch of

dorsal flexor tendons are contracted and inhibit complete extension. The metatarsal heads are depressed and prominent on the sole of the foot. The foot appears shorter and thicker in front. Callosities will have formed on the sole of the foot under the



FIG. 2.—Clawed toes. (Hoffman.)

transverse arch. The patient will find difficulty in obtaining a comfortable shoe and will complain of pain in the forefoot in the region of the metatarsal arch.

In the most severe types the toes are strongly dorsiflexed at their metatarsophalangeal articulations and plantar-flexed at their interphalangeal joints. They are retained in this position not only by shortening of tendons, ligaments, and other soft structures, but also by bony changes of their articular surfaces due to the prolonged



FIG. 1.—Clawed toes. (Hoffman.)

the foot when the toes are in flexion; this entirely disappears on weight-bearing or when the flexion is corrected. In this type there are no structural changes or contractures. The deformity is of posture only.

In the moderately severe cases, in which the postural deformity has been allowed to exist untreated over an indefinite period of time, the toes are flexed to a greater degree and the depression of the anterior arch is conspicuous. In attempting to correct the flexion of the toes it will be found that the



FIG. 3.—Paralytic type, clawed toes. (Hoffman.)

continuation of faulty position and function. There results a complete dislocation of each metatarsophalangeal joint. The proximal phalanx articulates at its base with the dorsal surface of the head or neck of its metatarsal bone, and, as a result of

its vertical position, pushes the head of the metatarsal down into marked prominence on the sole of the foot. Thus the entire transverse or anterior arch of the foot is reversed and the front part of the foot much thickened.

The prominence of the unprotected metatarsal heads on the sole of the foot causes great distress to the patient. Large and painful callosities, and occasionally



FIG. 4.—Line of incision. (Hoffman.)

ulcers, form over these points of pressure against the sole of the shoe; at the same time the upper leather of the shoe presses upon and irritates the prominent and flexed interphalangeal joints. The toes are so tightly contracted that their function is entirely arrested, the foot loses most of its elasticity, and the gait becomes slow and guarded. The patient walks mostly on the heels, protecting the forepart of the foot at each step. In many instances the patients will have the leather tip removed from the shoe to give freedom and relief from pressure to the contracted toes. In other cases shoemakers have attempted to make especially adapted shoes with depressions in the inner sole into which the heads of the metatarsal bones are supposed to rest. At the best this is only palliative.

The deformity usually becomes progressively worse. In the severe cases the

patients are almost bedridden; each step is so painful that they dread to place any weight upon the forepart of the foot on account of the extreme tenderness under the metatarsal heads. In one of the writer's cases, a patient had tolerated this condition for almost twenty-five years, and when operation was advised the patient willingly consented, and remarked that if relief could not be obtained by any other method he would willingly submit to amputation of both feet, so great had been his suffering.

ETIOLOGY.

It is doubtful if clawed toes are ever congenital. In some instances a tendency to this deformity is observed in several members of the same family. This is best



FIG. 5.—Clawed toes. Left foot before operation. Radiogram by Dr. W. F. Manges.

explained by the occurrence of a type of foot, the conformation of which is more readily susceptible to the deforming compression of the modern fashionable shoe.

By far the most common cause of this deformity is the habitual wearing of short, narrow shoes of the pointed-toe type. High, narrow heels have the same tendency.

In these cases there is usually an associated hallux valgus, often of an exaggerated degree. In many there is a permanent contracture of the tendo Achillis. As a result of the high heel, short, narrow-toed shoe, the foot is placed in a position in which the weight-bearing is brought forward of the anterior arch and the toes are thrown into dorsal flexion. The inactivity of the



FIG. 6.—Clawed toes. Right foot before operation. Radiogram by Dr. W. F. Manges.

plantar muscles disturbs the balance that normally exists between them and the dorsal muscles. The uplift of the toes that results later becomes permanent.

Some few cases are caused by contractures following paralysis, especially mild unrecognized cases of infantile paralysis. These are often unilateral and are associated with pes cavus (hollow-foot).

TREATMENT.

In the mild and in many of the moderately severe cases, marked improvement can be accomplished in an attempt to restore muscular balance and function to the intrinsic muscles controlling the action of the toes and forefoot. All faulty footwear

should be first discarded; this includes all forms of supports, metal or elastic, tight and improperly shaped shoes, as well as short or tight stockings. There is no doubt that, at times, improperly fitting stockings have a decidedly detrimental effect upon the development and functions of the toes and foot.

A shoe should be worn that allows ample room for the toes to be spread to their fullest extent without compression. A flexible low shoe with a thin sole and low heel, or no heel at all, is preferable when a shoe is worn. Whenever possible a moccasin should be substituted. The contracted tendons should be forcibly stretched at regular intervals, and the patient instructed in a course of exercises for the toes and feet to stimulate muscle function and to establish the proper balance between the flexor and extensor action. The stretching of the tendons may be facilitated by the application of heat in the form of baking, which aids in the softening and relaxation of the contracted soft parts.

All forms of rigid support should be discouraged. There are times, however, in painful and spasmodic cases when temporary support, in the form of adhesive plaster strapping, may be of advantage. This should be used with the understanding that it is of temporary benefit only, to relieve pain, and the sooner discarded the better for the best interests of the patient in view of an ultimate cure.

Cook's anterior heel is, at times, used in this connection. This consists in the introduction of a rigid wedge of leather placed between the two layers of the sole leather of a shoe in a transverse position, just posterior to the position occupied by the metatarsal arch of the foot; the object being to relieve the weight-bearing from the metatarsal arch and transfer it to a posterior position, at the same time having a tendency to throw the toes into plantar flexion. While the anterior heel does, at times, relieve pain and possibly places the foot into a better position, it is only palliative in action and does not in itself promote function or tend to cure.

In a certain number of cases, in which the deformity appears to be due solely to a marked shortening of the dorsal flexor tendons, it is advisable to release the contractures by multiple tenotomies, after which the toes should be splinted until the divided tendons have completely healed in their elongated position, and then be followed by strenuous efforts at muscle reëducation for the promotion of muscle balance and function. In any case in which the foot is impeded in function by a short tendo

several years by the writer, in the department of orthopedic surgery in the Jefferson Medical College Hospital, with the greatest satisfaction for the relief of the severe cases of clawed toes, has been an operation first described by Dr. Phil Hoffman.¹

The operation consists in the excision of the heads and, if necessary, parts of the necks of the metatarsal bones of all of the affected toes. Hoffman advises a single transverse curved incision just behind the web of the toes. The skin and fascia are



FIG. 7.—Clawed toes. After Hoffman operation. Radiogram by Dr. W. F. Manges.

Achillis, a tenotomy of that structure is indicated.

Many ingenious tendon operations have been devised, by as many surgeons, each with the object of restoring the anterior arch of the foot by tendon transferences. Corrective osteotomies of the metatarsal bones have been advised by other operators. Each method has its advantages in some cases and its limitations in others.

The method that has been employed for

reflected and the metatarsal heads exposed. The metatarsal heads are very superficial, due to their faulty position, and are easily accessible. The plantar incision permits free inspection of the parts and readily enables the operator to determine the amount of the metatarsal head and neck that must be removed to permit the phalanx to fall into the proper alignment with its

¹An Operation for Severe Grades of Contracted or Clawed Toes. *American Journal of Orthopedic Surgery*, February, 1912.

respective metatarsal. Sufficient bone should be removed to relax all contractures and to permit of free motion and proper alignment between the base and the proximal phalanx and the metatarsal stump. The bones are divided by the usual straight bone-cutting forceps or a narrow chisel. Hoffman strongly emphasizes the importance of removing sufficient bone. Experience has proven that it is wise to remove the entire head of the metatarsal and a considerable part of the neck.

Tenotomy of the flexor or extensor tendons is unnecessary as they are sufficiently relaxed by the shortening of the metatarsus. The tendons are placed to one side when the bones are removed, and care should be taken to avoid wounding them.

The skin incision is closed in the usual manner. Sterile or wet alcohol dressings are applied. The toes are separated and retained in the desired position by placing small pads of gauze between each toe. No splint or fixed dressing is used. The stitches are removed in about eight to ten days. Passive motion to the toes is started at the tenth day and continued for several weeks. The patient is allowed to walk in about three weeks.

The results have been remarkably good. The incision, being close to the web of the toes, brings the resulting scar into a position that is not irritated by walking. The feet are painless, and with joints that are freely movable and capable of the usual amount of function. The operation shortens the foot to a slight degree, but removes the rigidity and thickness of the forefoot. By removing the metatarsal heads the sole under the anterior arch becomes soft, and there is no longer a tendency to the formation of callosities. Weight can be borne comfortably by the transverse arch and the gait becomes normal.

Claw-foot treated by this method of operation does not have a tendency to recur, and the relief afforded is permanent. In one case, referred to above, of twenty-five years' standing the operation was performed about five years ago. The patient is now employed as a foreman in a large

factory, and his occupation necessitates his being on his feet most of the day, frequently climbing upon scaffolds. He has not suffered the slightest pain or inconvenience from his feet since leaving the hospital.

200 SOUTH 12TH STREET.

BLOOD TRANSFUSION: REPORT OF EIGHTY-FIVE TRANSFUSIONS.

In the *Canadian Practitioner and Review* for October, 1916, UNGER reports on his experience and discusses the various methods used by different physicians. As to those methods which utilize anticoagulants, he thinks the best anticoagulant is sodium citrate. Although the technique is simple, the blood to which an anticoagulant has been added is not in every case as valuable as whole unmodified blood. As to the question of possible chemical changes there are two important points which Unger refers to:

The effect of the intravenous use of citrated blood on the coagulation time of the patient's blood. Dr. Libman, Dr. Richard Weil, and Dr. Ottenberg have each reported the following: The injection of sodium citrate alone or with blood will promptly shorten the coagulation time of the patient's blood. Within twenty-four hours, however, it will either return to what is normal for this particular patient or be prolonged. If subsequent injections are given the coagulation time either will be immediately markedly prolonged or it will be primarily shortened, but within twenty-four to forty-eight hours, instead of returning to the patient's normal coagulation time, it will be markedly prolonged. If, during the period of lengthened coagulation time, the patient should begin to bleed, the result, theoretically at least, might be serious. It has not been determined that the shortened coagulation time will arrest hemorrhage, nor on the other hand that the lengthened coagulation time will prolong it.

The second fact that Unger wishes to report is the frequent occurrence of chills, high temperatures, and vomiting, following citrate transfusions. The exact percentage

of cases in which these symptoms occur he cannot state because a sufficient number of cases have not as yet been reported in the literature. Dr. Richard Weil suggests that they may possibly be due to intravascular clotting. He bases this view on the fact that if to 10 Cc. of blood, to which has been added 1 Cc. of 2-per-cent sodium citrate (0.2-per-cent solution), 10 Cc. of saline is added, clotting will occur. Dr. Lewisohn thinks that these symptoms are rather due to chilling of the blood during its transfer from donor to patient. Another theory is that they are symptoms pointing to the toxic action of citrated blood. The chief value of citrated blood lies in: (1) it can be carried to the patient in cases to which it may be impossible to bring a donor; (2) it can be preserved and given in divided doses or kept for an emergency.

In the 85 transfusions which Unger has done by his method there have been no chills due to the transfusion. In one case in which the tests for hemolysis and agglutination had been omitted, a chill due to hemolysis occurred. In eight cases there was a rise in temperature ranging between 101° and 104°.

From the point of view of the technique of the method, all of the 85 transfusions done by Unger's method were successful. If we consider the cases as they were influenced clinically and follow the classification adopted by Dr. Libman and Dr. Ottenberg, the results were as follows:

Successful Cases.—(1) Twenty-two and one-half per cent of the transfusions were done on cases in which the prognosis was extremely bad and in which transfusion saved life. This group is divided into (a) those who completely recovered (9.5 per cent). The transfusions were for post-operative hemorrhage, bleeding of the newborn, intra-abdominal hemorrhage, bleeding duodenal ulcers, ruptured ectopic gestation. (b) Those in whom the underlying condition (13 per cent) continued. The transfusions were for bleeding gastric ulcer, intestinal bleeding, pernicious anemia, severe secondary anemia, purpura hemorrhagica.

(2) Thirty-nine per cent of the trans-

fusions were in cases which were improved or cured, but in which the prognosis at the time of the transfusion was not desperate. Some of these were cured while others were improved, but the underlying condition continued.

The transfusions were for hemophilia, pernicious anemia, aplastic anemia, Von Jaksch anemia, lymphatic leukemia, Henoch's purpura, carcinoma of stomach, carcinoma of head of pancreas, ulcerative colitis, pyelophlebitis, sepsis, dysentery, parenchymatous nephritis, intense secondary anemia (preliminary to an exploratory operation), persistent uterine hemorrhage, bleeding ulcer of small intestine, chronic interstitial nephritis with rectal bleeding, ruptured ectopic gestation.

Of the 85 transfusions, 52 (61 per cent) were successful from a clinical point of view. Nineteen of the successful cases (22 per cent of the entire 85 transfusions) were life-saving.

Unsuccessful Cases.—(1) Eight per cent of the transfusions did little or no good, although from the nature of the disease a good result might have been possible. These were cases of pernicious anemia, hemophilia, purpura hemorrhagica, and coal-gas poisoning.

(2) Nine and one-half per cent of the transfusions were followed by temporary improvement, but subsequently the patient succumbed to the original disease. These include cases of hemorrhage in typhoid fever, bleeding gastric ulcer followed by a very radical operation, carcinoma of the stomach, pernicious anemia, actinomycosis with bleeding from multiple hereditary family telangiectases.

(3) Twenty-one per cent died of some disease necessarily fatal, and in which transfusion could not have been expected to do much good, but was employed as a measure of last resort. These include cases of uremia, empyema with intense toxemia, actinomycosis of the lung, carcinoma of stomach, carcinoma of colon, ulcerative colitis, subphrenic abscess, acute hepatic insufficiency, acute salpingitis with peritonitis, pemphigus, acute lymphatic leukemia.

EDITORIAL.

SPLENECTOMY AND TRANSFUSION IN PERNICIOUS ANEMIA.

Pernicious anemia is fortunately a comparatively rare disease, but those who practice in large cities not infrequently come in contact with it and recognize that, like certain forms of tuberculosis, its progress may be slow, but, nevertheless, a fatal issue is inevitable. Much has been done to add to our knowledge of the pathological conditions which underlie its existence, but as yet little has been accomplished in determining its underlying cause. Up to within a few years it was thought that the administration of arsenic produced better results than any other plan of treatment, often appearing to arrest or abate the disease for a considerable period of time. More recently good results have been obtained by hypodermic injections of cacodylate of sodium, and, still more recently, various surgeons and physicians have attempted to arrest or cure the malady by removing the spleen.

It would appear that the results which have been obtained from splenectomy are so good as to make this procedure worthy of careful consideration in all cases, and, if the operation is not delayed until the state of the patient is desperate, its danger is not so great as to cause timidity in the face of the otherwise inevitable progress of the condition. If splenectomy can arrest or cure Banti's disease, in which it will be recalled there is also marked cirrhosis of the liver and sometimes ascites, it may fairly be concluded that in pernicious anemia, in which such important lesions do not exist, the chance of recovery is greater. Splenectomy has also been employed in a number of cases of so-called hemolytic jaundice with sufficiently good results to justify its consideration in that disease, which is not surprising when the probable close association of these two maladies is considered, for it will be recalled that no less an authority than Eppinger is of the opinion that the only

material difference between pernicious anemia and hemolytic jaundice is that in the latter disease the bone-marrow is able to compensate for the destruction of the blood cells, a compensatory function which seems to be absent in pernicious anemia.

In those instances in which the anemia has become profound the danger of operation, as we have already pointed out, is naturally increased and the chances of recovery from the anemia are also diminished. In such instances it would appear that transfusion may prove a valuable measure. It is by no means a new thing to attempt transfusion in this disease, and, when it has been attempted, not rarely the patient's condition has been materially improved, but, as a rule, for only a short time, since the blood of the donor is simply an addition to the blood of the donee, and possibly is exposed to the toxic or degenerative influences which have destroyed the patient's own blood. The speedy relapse of the patient when transfusion has been tried has discouraged physicians from commonly resorting to it. Here, again, in many instances, transfusion has not been attempted until the patient is so far advanced in the disease as to be a hopeless case.

When splenectomy is performed it would appear that the removal of this organ tends to prevent the rapid destruction of the blood of the donor. In other words, splenectomy seems to remove the active factor in the maintenance of the disease, and if in addition the patient receives repeated transfusions of whole blood from the same donor, or from other donors whose blood has been proved not to produce hemolysis in the donee, excellent results are achieved. That is to say, splenectomy and repeated transfusions are the needful agents in many of these cases. The time for additional transfusion is determined by the tendency on the part of the patient's blood to relapse into its former condition.

It must not be thought that we are taking the attitude that in splenectomy and repeated transfusions a cure of pernicious

anemia has been found. The only thing that can be said concerning these measures is that at the present time, particularly in association with arsenic, they seem to offer more promise than any measures which have so far been brought forward.

THE CURE OF ARTHRITIS BY INDIRECT EFFECT.

It has become increasingly evident during the last decade that the various forms of arthritis, acute and chronic, are widely different as to their etiology, even if it be true that the result to the patient is identical, in the sense that disability or impairment of movement is induced. It must also be borne in mind that, even if we deal with this subject under a somewhat crude nomenclature, we have to recognize that in some instances the pain, or discomfort, from which the patient suffers is due to a bursitis, a synovitis, or an actual involvement of the articulating surfaces of the joint—in other words, involvement, or active disease, of the cartilaginous surfaces. All these conditions were supposed by physicians of forty years ago to depend upon some diathesis, usually gouty or rheumatic in nature, and even acute articular rheumatism was, at that time, supposed to be a local manifestation of a perverted nutritional change which resulted in the production of an excess of acid in the body. We now know, as we have just stated, that while these conditions are undoubtedly in some degree responsible in certain cases of arthritis or synovitis, even in these cases there is often an associated infection, and it is yet to be determined whether the infection is a primary factor, or whether it is secondary to the underlying condition of the body.

The discovery that these joint conditions frequently develop as the result of the entrance into the blood stream of pathogenic microorganisms, by way of the tonsils or through some solution of continuity in the blood-vessels or lymphatics, has resulted in a very thorough search for patho-

genic organisms in such patients and an equally thorough search in the hope of discovering the opening through which they have gained access. It having been recognized that the gonococcus in the urethra or the streptococcus in the tonsil not infrequently enters the blood and causes an arthritis or endocarditis, or both, it was a natural step to jump to the conclusion that a considerable proportion of arthritic cases owe their existence to the entrance of pathogenic germs from the intestine, particularly from the large intestine, and so it has come to pass that, at the present time, many surgeons are devising and carrying out operative procedures designed to permit of colonic irrigation, to establish drainage, or, by means of short circuits, or the removal of so-called kinks, to improve the condition of the large bowel with the hope that dominant symptoms in the joints will be relieved.

There can be little question that these measures have been carried much too far. It is quite true that certain patients have been markedly improved and possibly made well after convalescence from the operation has been completed, but it would be interesting to know how many of those persons who have been subjected to such radical surgical methods, which distinctly belong to the realm of major surgery, have not been benefited, either because they have died from the operation, or operative sequela, or because, having recovered from the operation, they find themselves no better as to their arthritis, and considerably worse as to their digestive tract. We think that many of the men in the profession, who are perfectly willing to be radical in case of need and who are also conservative in the sense of good judgment, are convinced that many of the various operations which have been performed upon the sigmoid and colon have been disadvantageous rather than otherwise.

In discussing this operation with those who are suffering from obscure joint affections the following points should be borne in mind: First, the immediate danger of the operation; next, the secondary dangers;

and third, the various forms of abdominal pain and discomfort, which the physician often sees after the surgeon considers his patient well. It should never be forgotten that it is difficult to imagine a more unhappy state than one in which the surgeon has induced an abnormal condition of the bowels in a patient whose joints are too stiff for him to beat a hurried retreat.

Another question which is of interest in this connection, and which has some bearing upon the method by which a so-called cure is induced, is as to whether the improvement is really the result of arresting the entrance of pathogenic organisms into the system from the intestine, or whether the improvement does not arise from the administration of the anesthetic and the shock of the operation, which, to use a homely simile, may be likened to the effects produced in a watch when it is struck a blow. In other words, these procedures sometimes result in such a disturbance of metabolism, or of the nutritional processes, as to cause a complete change, which may be for good and which may be for evil.

Some months ago we called attention to a series of researches upon the effects of injecting various protein substances into persons suffering from different infectious diseases, like typhoid fever and pneumonia, as well as those suffering from various forms of infectious arthritis. It will be recalled that these investigators showed that a fairly large proportion of such patients, particularly the arthritic ones, often showed marked improvement from such injections, although there was no relationship whatever between the protein injected and the microorganism which was responsible. Is it not possible that in some of the cases of arthritis which have been benefited by operative procedure of a radical nature the change for the better which has ensued has been due to what is practically an injection of foreign protein, since, under the knife of the surgeon, vessels are opened and albuminous, or protein, substances have an opportunity to enter the vessels in an even more direct way than when subcutaneous injections are used, and

possibly over a longer period of time than when intravenous injections of a foreign protein are employed? It may be true that these substances which gain access to the blood-vessels are not foreign in the sense that they had had their origin from another source than the body operated upon, but they are foreign in the sense that they belong to the tissues outside the vessels and are not normal constituents of the blood in the vessels.

We think it is probably a fair statement of the case to assert that there is a small percentage of primarily obscure cases of arthritis which can be benefited by intestinal operation, but no such operation should be attempted until every other source of infection has been thoroughly hunted for and absolutely eliminated, nor should it be tried until every hygienic method and mode of cure has been given a sufficient trial to enable the physician to assert that nothing else will hold any promise of doing good.

Finally, in some cases at least, it is only proper to inform the patient of the possible results of the operation, as to adhesions, obstructions, and other conditions which may necessitate one, two, or three subsequent operations. Cases of this kind are sometimes, though rarely, reported in the journals. On the other hand, it is not uncommon to find so-called cured cases reported with much enthusiasm. Thus, in a recent journal, a surgeon reports a case of a woman of fifty who was in the terminal stage of arthritis, in constant pain, unable to turn over in bed, and unable to use her hand sufficiently to write or to feed herself. The statement is made that within twenty-four hours after operation upon the colon she was able to turn over in bed, and in three days the pain was gone. Does not such an improvement indicate two things: First, that the actual changes in the articulating surfaces of the joints and in the synovial membranes must have been much more grave than they were thought to be? Does it not bring to mind the possibility that there was a marked hysterical element in this case? Or, again, does it raise the question as to whether so rapid an

improvement did not follow the entrance of a foreign protein and not depend upon stopping the absorption of toxic material or pathogenic microorganisms from the intestine? Surely an arthritis which had its origin in what might be called a septic colitis could scarcely be cured by the mere removal of the cause in such a short space of time.

Last, but not least, it would seem that having debated this question carefully in his mind and having decided that operative interference is indicated in a given case, it is the duty of the physician not only to be frank with the patient as to possible dangers, failures, and successes, but to see to it that the patient passes into the hands of a surgeon who, on the one hand, has had so large an experience in intestinal surgery as to make him *facile princeps*, and yet, on the other hand, is known to be one so well balanced in his judgment as not to have performed a multitude of such operations because he is a "faddist" and because, being carried away by a "fad," he has been unable to properly interpret the results which have been obtained.

SO-CALLED TWILIGHT SLEEP IN OBSTETRICS.

There is probably no theme of greater interest to women and medical men than this one. Because many well-qualified obstetricians have expressed their doubts as to the wisdom of resorting to the hypodermic injection of scopolamine and morphine to relieve the pain of labor, there has been a tendency on the part of some of the members of the laity to take the attitude that obstetricians are callous, and that, as long as the labor terminates advantageously, the question of pain is a negligible factor. Such evidences of misjudgment are not uncommon where the emotions and affections are potent factors in determining opinion. As a matter of fact it is the duty of the physician to see that nothing is done to, or administered to, a parturient woman which will in any way jeopardize her safety or her life or that of her offspring, and while

it is true that a very considerable number of papers have appeared, chiefly in European literature, in which so-called twilight sleep is cordially recommended, it is also true that in this country and in England those members of the profession who have employed it are by no means convinced as to its efficiency or safety.

As pointed out by Hirst in the discussion of a paper upon this subject presented to the Pennsylvania State Medical Society, even the most ardent advocates of twilight sleep admit that it is only in the first stage of labor that this method is of marked value, and, therefore, chloroform and ether must remain the anesthetics commonly employed in the second stage. It is quite true that many obstetricians, working in hospitals, have found nitrous oxide gas and oxygen to be efficient, but the weight and bulk of the gas-oxygen apparatus, the necessity of its being employed by an expert, its expensiveness, and, Hirst thinks, its tendency to produce still-born or apneic babies, militates against its general employment. Hirst believes that if enough morphine and scopolamine is used to produce indifference to pain there is prolongation of labor, a tendency to atony of the uterus with hemorrhage, increased necessity for instrumental delivery, and an increased number of babies which cannot be revived. He believes that the majority of American obstetricians are in accord with him. If such small doses are given as to be perfectly safe to mother and child the drugs, in many cases, are inadequate. Hirst recognizes, however, that there is a certain amount of demand on the part of some women for this medical treatment, particularly in nervous or neurotic, apprehensive persons in whom the hypodermic injections produce a useful psychic influence, but he believes that when the injections are given the additional precautions of darkening the room, bandaging the eyes, stuffing the ears with cotton, and banishing from the room every one but the trained nurse and doctor, are often of more use than the drugs themselves. He also states that he has been using cannabis indica with fairly satisfac-

tory results, in the sense that it produces a feeling of indifference to pain and a tendency to hilarity. He found that one-half-grain doses of the extract were not sufficient and often gave as much as 4 grains.

In the paper by Freeland which has been published in the *Pennsylvania Medical Journal* for July, 1916, this writer states that his reports are based upon seven years' experience with the method. Concerning its influence upon the child, he expresses the belief that apnea is no more frequent after this method has been employed than with any other anesthetic. So far as the labor is concerned Freeland thinks that it does not materially lengthen it, but he states that the average duration of labor in 236 primiparæ was 22 1/6 hours, which would seem to be a fairly long or prolonged period. In that type of case in which scopolamine produces delirium and uncontrollable restlessness it does delay labor and even necessitates the application of forceps.

After all, one of the most important factors to be considered in determining this matter is how far this method actually relieves pain. Freeland thinks that it produces complete relief of pain in fifteen and a half per cent, great relief in fifty-seven and a half per cent, marked relief in seventeen per cent, no effect in ten per cent, and out of 236 cases delirium occurred five times.

Finally, Freeland's conclusions are that scopolamine is a useful sedative, not anesthetic, when not pushed to the extreme of physiologic tolerance, that under these conditions it is without danger to the child, that it has not a retarding influence upon the progress of labor, and, possibly most important, that injurious mental results can and do commonly occur, and care should be taken to avoid its use in patients whose make-up suggests such possibilities. In other words, we presume that he means by these words neurotic individuals who have not a very stable mentality.

In the February issue we will publish several articles dealing, more or less directly, with this important subject. In connection

with the quotations already made these contributions will provide our readers with a full understanding of this highly interesting matter.

MEDICAL PREPAREDNESS.

In a broad sense every earnest medical student and every studiously observant medical practitioner is preparing for the war which most people think both inevitable and imminent—that is, he is preparing for his particular part in the war; nor in the case of the surgeon at or past middle life is further preparation needful or desirable, since such ones should be used either as consultants or directors in their purely professional capacity, or should be given the care of patients discharged from base hospitals to the interior.

On the younger professional men will fall a more varied responsibility: (1) The duty of examining recruits—that is, of selecting men physically fit to stand a rigorous course of military training and to profit by it. (2) The early recognition of those who soon show that they are physically or mentally unfit. (3) The protection of the soldiers against disease; this implies a broad knowledge and a rigorous application of the rules of military sanitation. (4) The immediate care of those crippled in the service, their prompt and safe conveyance to dressing stations or hospitals; this includes the whole broad question of transportation. (5) A working knowledge of the record system obtaining in the army. (6) A practical knowledge of food; its initial value, standards of excellence, and best methods of preparation.

It is obvious that a medical education, even a broad one supplemented by specialization in surgery, reënforced by a large patriotism and the wish to help, are not enough to fulfil the requirements, even as sketchily outlined above. The work is distinctly technical in many of its phases and requires a specific, direct, and practical preparation; in part provided for by the United States in its camps at Plattsburg and Tobyhanna, in part by its correspond-

ence school, in part by experience gained in service with the National Guard.

It is obvious that complete efficiency can be attained by the thousands of the younger medical officers who will be called out to active service only by actual experience, and it is equally obvious that this efficiency will come earlier and be more complete in direct proportion to the painstaking efforts to prepare in so far as this is possible in times of peace, nor does this preparation consist in the purchase of a uniform and the receiving of a commission in the Reserve Corps. Every man who believes he is still young enough to play an active part in the coming war should attest the sincerity of his conviction by availing himself to the full of the opportunities offered by the Army Medical Corps.

Aside from personal preparedness there is preparedness concerning material needed. Thus, at the suggestion of the National Red Cross, numbers of base hospitals have been organized. These are usually in connection with teaching institutions and with the thought in mind that thus might be assembled a staff of more than average experience and so used to each other's ways that team work might be expected from the beginning. Such a base hospital was mobilized in Fairmount Park on the last day of the meeting of the American College of Surgeons in Philadelphia. The army furnished the tentage, which was put up with extraordinary speed by Major Harold Jones with a small corps quite untrained as a working team. The equipment was sent over from New York from the Presbyterian Hospital, their unit under Dr. George Brewer having purchased the \$25,000 worth of material needful for the supply of the base hospital. The personnel was brought on by Dr. George Crile, of Cleveland, as representing the Lakeside unit. This hospital was prepared to receive patients and could have adequately cared for them. In itself it was of little service beyond a practical demonstration of the earnest purpose of those advocating preparedness, and unless it is followed by something very much better and more com-

plete—for instance, such a base hospital as was exhibited in model by Brewer—it will have fulfilled no largely useful purpose other than that incident to the demonstration of the difficulties and delays attendant upon any mobilization.

Dr. F. F. Simpson is now engaged in a careful inventory of the medical resources in the United States, including both hospitals and medical and surgical supplies. Dr. Bloodgood and his committee are concerned in solving the question of the most efficient first-aid package. Dr. Estes and his committee are endeavoring to standardize the treatment of fractures.

The thousands of surgeons of both the Central Powers and the Allies have as yet failed to give us the answer as to the best treatment of lacerated, contused, and infected wounds aside from free drainage.

It will be well for each medical man to set clearly before himself the thing for which he wishes to be prepared. For the home service the educated man is ready; for field service he requires a complete and extensive education. If he anticipates field service the more quickly he gets the rudiments of this education in time of peace, the more surely will he attain efficiency and honors when the need comes.

DIAGNOSIS OF URINARY CALCULI.

In former years the diagnosis of renal, ureteral, and vesical calculus was regarded as extremely easy. A renal or ureteral calculus of surgical moment was supposed to occasion pain paroxysms of prostrating severity which radiated along the course of the ureter and often into the genitals. It was accompanied at first by a difficulty in emptying the bladder, and later at times by slight frequency and urgency, or there might be no bladder symptoms. As an occasional symptom hematuria was recognized, rarely severe, often recurrent, mostly indicated by the presence of occult blood. Vesical calculi were supposed to be accompanied always by painful and frequent urination, with stoppage of the flow toward its end, and with pain, worse at the termination of

the act of micturition and referred to the end of the penis. Moreover the presence of calculus and the absence of pus in the urine were regarded as extremely unusual.

It has been shown that calculus may remain in any part of the urinary tract for years without causing symptoms, or at least symptoms which would strongly suggest the presence of stone; that these symptoms when they do develop may exceptionally be referred to the gastrointestinal tract; that in the main, in the case of renal stones, they are expressed in the form of a dull ache in the costovertebral region, radiating if at all downward; very exceptionally in the form of pain in the abdomen. This dull ache is often, but not always, accompanied by renal tenderness, best detected by manual palpation in the costovertebral angle. It is often but not always associated with hematuria either obvious or occult, commonly made worse by jarring and active exercise, as is the dull kidney ache. Even though the stone be lodged in the ureter or bladder it may yield practically no characteristic symptoms.

The question of diagnosis is then not only an important but at times an extremely difficult one. Fortunately it should be settled by careful *x*-ray pictures, which, expensive though they may be, are absolutely needful in recognizing underlying conditions in so many obscure cases. The *x*-ray has been depended upon somewhat blindly as an infallible finder of stone. Cabot was one of the early ones to point out its fallibility, and indeed some compe-

tent observers go so far as to claim that it fails in 25 per cent of cases.

The renal tests are of distinct value, particularly the test of the separate kidneys as conducted by catheterizing of the supposedly sound kidney by an instrument so large as to occlude the ureter at or beyond the point of catheterization, and drawing from the bladder the urine which passes in a given time down to it from the supposed crippled side. A given series will show delayed elimination and often one which is profoundly influenced. This must be regarded as a suggestive sign.

In so far as renal stones are concerned, however, it must be acknowledged that the condition may exist without giving one single characteristic sign or symptom, and that the symptoms may be all referred to the abdomen. This circumstance must be carefully considered in deciding the true basis for certain obscure abdominal complaints.

It would seem incredible that a stone should remain in the bladder without giving symptoms. Yet there are repeated instances of stones of very large size evidently existent for years, lying bathed in a sterile urine and causing no symptoms whatever, not even frequent urination, and detected accidentally in the course of examination for other conditions. This, however, is much rarer than in the case of the kidney. Nor in such symptomless cases is there the same need for accuracy of diagnosis and prompt therapeutics as there may be with kidney stones with referred symptoms.



REPORTS ON THERAPEUTIC PROGRESS.

TREATMENT OF ARTERIOSCLEROSIS.

Northwest Medicine for September, 1916, contains an article by JAMES in which he admits that vasodilators are of value in reducing high pressure. To be sure, it is symptomatic treatment, but why not? A vicious circle may be broken by improvement of a symptom. The nitrites may be used for relief of high pressure, not, however, if the heart shows signs of yielding. If used, it should be in increasing doses and with watchfulness. An occasional course of calomel, or blue mass, is usually indicated. Iodides in other than syphilitic cases are used empirically and with good effect, their favorable action probably being due to a decrease in the viscosity of the blood. This latter is also effected by the use of mineral waters, baths, and purgatives.

Venesection is a remedy very useful in two ways: first, as a part of the treatment in cases of hyperpiesis in robust, plethoric individuals, even in the absence of an emergency; second, as a relief in a crisis. James has used it in both classes to his satisfaction generally. When used to relieve the ordinary symptoms of high pressure in properly selected cases, it is resorted to about twice a year. Following the withdrawal of a pint to a pint and one-half of blood, the patient experiences considerable relief. The blood-pressure drops and may remain at a lower level for several months. It is gratifying to have a patient return in, say, six months for another venesection with the voluntary statement that she has been so much better but feels that it is time to repeat it. Patients who have experienced this relief look forward to the treatment with confidence. In crisis like threatened cerebral hemorrhage the results of bloodletting are very encouraging. In choosing cases for venesection we should have clearly before us the classification of arteriosclerosis, for, while it is a measure of considerable value in the hyperpietic form, it is scarcely applicable to the de-

crescent cases. In fact, the results in the latter class might be disastrous, as also in cases anemic from chronic nephritis.

In toxic arteriosclerosis the blood-pressure is not raised, so depressor remedies are not needed. The treatment is that of the particular poison or infection concerned. Syphilis is the most common infection, and a discussion of its treatment could not be undertaken in a paper of this scope. With the present improved remedies at hand and the improved laboratory methods of accuracy in diagnosis, cases of syphilis will generally be cured before sclerosed or atheromatous blood-vessels require treatment. For the toxic forms rest, massage, baths, diuretics, and cathartics will be the remedies used.

James has tried to show that much can be accomplished in the treatment of arteriosclerosis due to hyperpiesis by treating the high blood-pressure to which it owes its origin. Unfortunately, in decrescent arteriosclerosis we cannot anticipate any such fortunate results of treatment. It is to this form we refer when we say "a man is as old as his arteries," and as we cannot subtract years from his age, we cannot extract calcareous deposits from his arteries. We may watch and wait, lending a hand here and there, but the result is inevitable. We dare not interfere with a moderate rise of blood-pressure, for it is compensatory. The arteries are less resilient and there is more friction, consequently the heart's action increases in force to overcome the odds.

Just a word in regard to indications for treatment, furnished by blood-pressure readings. Diastolic as well as systolic blood-pressure should be taken and the pulse-pressure estimated. The probabilities of loss of cardiac compensation in cases of high blood-pressure increase directly with the increase in pulse-pressure. Consequently, a high pulse-pressure is a contra-indication for the use of depressant measures. On the other hand, it is a positive

indication for guarding the heart muscle and the use of a drug of the digitalis group. In high blood-pressure cases, if the pulse-pressure be low—that is, if the diastolic pressure be comparatively high—cerebral hemorrhage is to be feared and sudden muscular effort might be fatal. Depressants or venesection in such cases may be indicated, although all measures for immediately lowering blood-pressure should be used very guardedly. It is a grave error to assume that very high blood-pressure (systolic) should be promptly reduced. It is frequently compensatory, and disastrous results may follow this reduction.

PROGNOSIS AND PROPHYLAXIS IN ECLAMPSIA.

In *The Practitioner* for September, 1916, STRACHAN expresses his belief that eclampsia is preventable. Edgar and some others dogmatize that it is absolutely so, but from his knowledge of the pathology of the condition he cannot, personally, go so far in his views. Undoubtedly, however, the great majority of cases could be prevented, and of no disease can it be more fittingly said that prevention is better than cure. Again, the prognosis and prophylaxis in this disease are very closely related, and few things influence the outlook so much as the amount and quality of efficient prophylaxis. The maternal mortality is usually reckoned as about 25 per cent, and, obviously, to prevent the appearance of so dangerous a condition is much more satisfactory than to step in to the established condition, with even the most efficient treatment.

The first point about prophylaxis is, clearly, that in the great majority of cases it must be carried out by the general practitioner. If the condition develops fully, the consulting obstetrician may be called in, or the patient sent to a hospital; but for the months before parturition it is the general practitioner who is to be on guard to see, as early as possible, the first premonitory signs of the condition, to treat with energy the early toxic manifestations, and

finally, if the condition develops fully, to institute curative treatment. It is, then, especially to general practitioners that these remarks are addressed.

The possibility of eclampsia developing in any particular case should be borne in mind by the practitioner, when he is engaged to attend any woman, especially a primipara. He should then appoint an early date, when he can fully examine his patient in bed. The general condition, the state of the tongue and teeth, the condition of the bowels, the presence or absence of edema, the duration of pregnancy, and the condition of the circulatory system, should all be investigated, and a specimen of urine examined. Presence or absence of albumin, and the relative amounts of urea and ammonium carbonate must be estimated. Of these, the ammonia-urea coefficient is certainly the most important point to which to pay attention, but it is only fair to assume that most practitioners have not the apparatus for such an estimation. Many cannot afford the necessary time, although when one has performed the formalin test a few times it does not take long to do, while the necessary apparatus is simple. But in most cases, in practice, the presence or absence of albumin will be the point mainly attended to. The specimen of urine need not, at first, be obtained by catheter; indeed, if always free of albumin, the catheter is not necessary. If, however, albumin appears, a catheter specimen must be obtained to determine whether the albumin comes from the kidneys or is due to fouling by vaginal discharge.

If all is found well, the patient should be advised about her general mode of life. She should eat light and easily digested food, varied according to taste, and insure a thorough but quiet evacuation of the bowel; drastic purges are to be avoided. In this respect, aloin, cascara, and calomel are the best drugs to use. One drachm of liquid extract of cascara at night may be given at first, and the dose increased or decreased, until it is found, by experience, how much in each individual case is sufficient, and no more, to insure a daily

action. A most satisfactory drug is the cascara evacuant (P. D. & Co.), which may be administered in the same way. Calomel, gr. 1, repeated hourly for three doses, with salol, gr. 5, also serves very well.

She should be out-of-doors for some time each day, and should take suitable exercise; a quiet walk or a drive in a rubber tired vehicle do very well, but such things as horse-riding or fast motor driving are strictly to be avoided. Sleep must be plentiful, and fully eight hours nightly should be secured, as well as, if required, a nap in the afternoon.

THE MEDICAL TREATMENT OF PEPTIC ULCER.

The *Virginia Medical Semi-Monthly* of September 8, 1916, contains an article by FERGUSON in which he claims that pyloric spasm is a factor in the treatment of gastric and duodenal ulcer, and often it is a distressing condition by virtue of the instantaneous vomiting induced by the spasm. In this condition the vagus nerve is a factor, and a new word has been coined to deal with it—vagatonia. Whether the spasm is produced by a vagus reflex, or by excessive activity of the vagus nerve and its activators, or by something else with which the vagus has to do, he does not know, but for immediate relief from the spasm and its consequences we have an effective remedy in a hypodermic of morphine.

Possibly the most universally employed drug in the treatment of peptic ulcer with the idea of its cure is subnitrate of bismuth in doses of about half a drachm several times a day, best given in barley water. It may be given alone or combined with bicarbonate of sodium or carbonate of magnesia; this is grateful both for the pain and burning, as well as counteracting the hyperacidity. If constipation is a factor, small doses of sulphate of magnesia or enemas are usually sufficient. In some instances the administration of pure olive oil is a very grateful remedy to the patient, about two ounces after meals. Olive oil could produce no physiological effect in any

given pathological condition, but it softens the sharpness of the acid contents of the stomach, and, besides, for a time makes in a mechanical sense a coating and a protection for the ulcer, which adds not only immediately and immeasurably to the patient's comfort, but by virtue of these things is helpful to nature in its tendency to a cure.

We are sometimes more fortunate than we are wise, and upon this principle Ferguson has come upon a remedy for peptic ulcer, which is mineral oil. What he has to say relative to this is based only upon the authority of his own limited experience. He is sure, however, that in this agent we have a most valuable acquisition to our list of remedies. Mineral oil would be indicated under any condition suggesting olive oil. It contains nothing that the body can assimilate; it is neither a drug, a poison, nor a food—nothing but a lubricant. It simply lubricates a defective drainage system until it becomes effective. It excites no muscle and stimulates no nerve.

THE TREATMENT OF LUES OF THE BRAIN AND CORD BY SUBDURAL INJECTION OF SALVAR- SANIZED SERUM.

In the *Clifton Medical Bulletin* for September, 1916, NICHOLSON asserts that the routine use of lumbar puncture and the Wassermann reaction in every possibly doubtful case, even in the entire absence of physical signs, must be urged. In his clinic, positive findings are infrequent in patients ordinarily classified as psychoneurotics.

It is absolutely essential that patients be kept under observation for a long time and that treatment be persistently followed.

The use of mercurialized serum has in Nicholson's hands given more pronounced serological and clinical results than has salvarsanized serum. The symptoms which have been entirely relieved by treatment have been general malaise, pain, painful muscular spasm, decreased sphincter control, both of bladder and bowel. Ataxia has been very much relieved in favorable

cases. Serologically, all cases have shown marked improvement, and in two the spinal fluid has become entirely negative, even to cholesterinized antigen.

THE MECHANISM OF SALINE DRESSINGS.

TAYLOR in the *British Medical Journal* of September 2, 1916, states that the clinical superiority of the treatment by hypertonic saline dressings does not appear to be so decisive that the theoretical and experimental objections to their use can be disregarded.

The theoretical indications for the use of salt solutions appear to be based on an untenable hypothesis of the structure of the tissues about the wound, and an erroneous interpretation of physical and physiological laws.

Certain characters possessed by hypertonic NaCl solution are theoretically undesirable in a dressing solution, and their harmful action can be demonstrated experimentally and clinically.

Certain desirable results claimed to be effected by the use of hypertonic NaCl dressings cannot be demonstrated *in vitro*.

The chief beneficial character held by strong salt solutions, aside from the cleansing property possessed by all watery solutions, is their mild antiseptic action.

A detailed investigation of the specific character of special antiseptics may be a more profitable undertaking than an exclusive concentration upon the physical and physiological properties of sodium chloride.

THE LOCAL TREATMENT OF BURNS.

In the *British Medical Journal* of September 2, 1916, WILLAN states that the treatment employed in his wards has been as follows:

1. The blisters were punctured and the contents drained under strict antiseptic precautions, the surface being first sponged with carbolic acid solution, 1 in 20.

2. If it was a recent burn he applied the

service picric acid dressing as the first dressing.

3. He smelled the dressings at his morning and evening duty rounds. Early sepsis in burns has an unmistakable odor, and the sense of smell can detect it early.

4. If there was no smell the first dressing was left on for two days, when it was removed in order to puncture any further blisters which might have formed. An ointment was applied, made of equal parts of boric ointment and vaselin. This was plentifully spread on strips of white "surgeon's lint," which does not tend to adhere, and so is not a painful procedure.

5. If the dressing had the septic smell the infected part was fomented with boric fomentations every four hours. The fomentation was four-ply, and the covering jaconet projected for half an inch beyond the margins of the focus in order to keep in the moisture. When the area cleared up—that is, when all sloughs, etc., had separated and a clean surface was left—the above mentioned ointment was similarly applied once a day, according to the amount of pus which had been secreted from the raw surface.

6. If the burn was aseptic the loose skin of the blisters was not removed, but was left to act as a protection to the exposed deeper and painful layer of the skin.

7. If the burn was septic all loose skin was cut away; under these conditions the skin harbors harmful toxins which are readily absorbed to the detriment of the patient.

8. The dressing next to the skin was covered by alembroth wool, which contains a small amount of antiseptic (mercury perchloride), sufficient to prevent multiplication of any organism the wound discharges. The whole dressing was fixed by a bandage loosely applied.

9. Face masks were not used except when a fomentation was required. With face burns the nose, cheeks, and lips were frequently smeared with the ointment, which was gently massaged in with the convex surface of a teaspoon.

As prevention is much easier than cure, the greatest possible care was taken to prevent any infection of the burn wound, and the precautions particularly applied to a wound which was already septic. The vitality of such a patient is low, and his vitality is still further reduced by the continued absorption of the toxins formed by the septic bacteria. The exposed deep layers of the skin absorb toxins with avidity; until the septic sloughs have separated, and the infected area is quite clean, this absorption continues to occur, thereby seriously exhausting the patient's strength. If sepsis is present every effort is made to eliminate it as quickly as possible. If the patient can be kept going until this has occurred, he will most probably ultimately recover. If a further infection is added by any act of surgical uncleanness on the part of the surgeon, nursing sister, or sick-berth steward, this in a large number of cases proves to be the last straw. The patient may succumb before the separation of the slough from the living tissue (that is, the elimination of the sepsis) can be effected. Therefore to neglect antiseptic precautions in the treatment of a burn is akin to soundly kicking a man who is down on his luck.

To prevent infection sterile india-rubber operation gloves were used for dressing the burns, and were changed for each case. Further, a bowl of 1-in-20 solution of carbolic acid was kept on the dressing bogey, and the gloved hands were constantly sluiced in this. No burn was ever exposed until the area had been isolated by towels wrung out in carbolic acid, 1-in-20 solution; these lay on a sheet of jaconet the same size as a towel. After finishing a dressing, the towels were folded up and used for the next case. The same towels sufficed for a large number of dressings. All blisters were opened and drained under such antiseptic precautions. The person who applied a fomentation had first thoroughly washed his hands before doing this.

If Willan was suddenly inundated with a large number of burn cases he would provide, if possible, all persons who were to dress the wounds with smooth india-rubber

gloves. Should circumstances prevent changing of the gloves between cases, the gloved hands would be constantly rinsed in carbolic acid, 1-in-20 solution. For practical purposes any organisms would be thus removed from the smooth-surfaced glove.

This small series well illustrates the fact that burns up to the third degree will heal immediately, provided they are protected from the air by a mild antiseptic dressing. This can take the form of (a) lint soaked in picric acid, (b) dry boracic lint with boracic powder, or (c) ointment either smeared on directly or spread on lint.

As a first covering for a recent burn the service picric acid dressing is excellent, and can be quickly applied. When this dressing is removed in an aseptic case the skin presents a dry, yellow, crinkled surface, all loose skin being curled up.

Having once removed the picric acid dressing Willan never repeats it. His reasons are: (a) That a burn after the first forty-eight hours is more comfortable with an ointment dressing, and that the wound heals quicker; (b) the burnt area should be examined in order to empty any further blisters which have formed. To neglect the latter may mean that the coagulated serum becomes organized by vessels from the deeper layers of the skin, a most undesirable thing to happen.

The reason for using an ointment of equal parts boric ointment and vaselin is that it gives a mild antiseptic ointment of excellent consistence for the purpose. Boric ointment by itself is too firm and lies on the skin in the form of uncomfortable hard flakes. Vaseline by itself melts too freely at the body temperature and becomes disseminated in the lint upon which it is spread.

Any dressing which adheres to the raw area is not a good one, as it is uncomfortable for the patient, and there is bleeding on its removal. A boracic fomentation is comfortable and is an excellent method of quickly cleaning up a septic burn. The fomentations should be removed every four hours.

Willan did not use face masks excepting

when fomentations to the face were required. He finds a patient dislikes a mask intensely, and covering up his face has a depressing effect on him. More important still, with a face mask on it is impossible to treat efficiently the purulent conjunctivitis which was so frequent an occurrence in burns of the face; the eyes required irrigating at least every two hours.

The great value of the protection afforded by clothing was illustrated by the fact that in 22 out of 28 cases the head (including its junction with the neck and also the face), wrists, and hands were burnt. A mask should protect the face, while gloves should protect the hands. The gloves should have gauntlets, as two or three of his patients burnt on the arms were wearing coats at the time, and the flames had traveled up the sleeves.

The bandaging of the patient's limbs is a most important point. In the excitement of the battle it is easily forgotten that there is a great deal of edema and swelling after burns. A bandage, even loosely applied, will soon become uncomfortably tight. This causes intense agony, and if left on too long will result in gangrene of the limb. Immediately the cases arrived in Willan's wards he had all the bandages of the burn cases cut and left loose as they were until he was able to dress them. This gave great ease.

SOME FACTORS OF THE CARDIAC MECHANISM ILLUSTRATED BY CERTAIN ACTIONS OF BARIUM AND DIGITALIS.

In the *Quarterly Journal of Medicine* for July, 1916, BURRIDGE reaches, as the result of an investigation, these conclusions:

1. The heart reacts in two chief ways to drugs, etc. In the one case the reaction comes on apparently immediately after the drug reaches the heart, and passes off equally quickly on removal of the drug from the perfusing solution. In the other the change usually shows a distinct time factor in its development and especially in its subsidence. This second type of change persists for some time after removal from

the perfusing solution of the drug originally giving rise to it, and is to be regarded as a "state" of the heart.

2. The cardiac mechanism is made up of two factors: the actual working parts and the accessories. A suggestion is given as to the nature of the working parts and their mode of interaction. It is also suggested that evolution has determined an optimum power of interaction with each other of the parts normally present.

3. Digitalis acts as an accessory to the normal mechanism. It enables one element of the mechanism, calcium, to perform more work in certain directions than would otherwise be the case. The therapeutic effect of the drug is dependent upon its induction in the heart of a "state" in which that organ becomes more responsive to certain actions of calcium. The change induced by digitalis is a self-limited one. It persists immediately after the removal of the drug from the perfusing solution and then slowly subsides.

4. Barium acts as an imperfect substitute for an element of the normal machinery. When barium and calcium are present in mixtures the two elements attack common structures and produce their effects in accordance with the law of mass action (Ringer). Arguing from the results obtained with digitalis, cardiac insufficiency is due to alterations in the normal relations subsisting between the heart and the calcium of its perfusing solution (Burrige). The use of barium is thus contraindicated in such conditions, for in employing it we should be using a substitute, imperfect even under normal conditions, to carry on the functions of an element at a time when that element is unable to do its own work properly. Moreover, whatever action barium produces is obtained at the expense of calcium already present.

5. The systolic condition induced by barium comes and goes respectively with addition to, or removal from, the solution of the element. This barium contraction may be produced many times—thirty was an actual number—in the same heart. In marked contrast with this the systolic con-

dition induced by digitalis takes some time to come on, and a considerable time to pass off on removal of the digitalis from the perfusing solution.

6. Barium induces a "state" of the heart in which that organ has a decreased responsiveness to calcium. The "state" of the heart induced by barium is thus the opposite to that induced by digitalis, and it is shown that digitalis can act as an antidote to this damaging action of barium.

7. An antagonism exists between calcium and digitalis in regard to the "states" they induce in the heart.

8. It is shown that the temperament of the heart or its flexibility of reaction to a given dose of drug tends to change with the calcium content of the perfusing solution. Some general deductions are drawn from these experimental facts.

9. Some evidence is given that an inadequate supply of phosphates may determine a condition of cardiac insufficiency.

THE HOSPITAL TREATMENT OF SIMPLE CHOREA.

BAILEY in the *New York Medical Journal* of September 23, 1916, expresses the belief that the treatment consists principally of rest and isolation. This means rest in bed, with curtains drawn, and no communication allowed with other patients in the ward and no visitors. In certain cases cold packs are given, and in the presence of rheumatic history, and even without it, rheumatic remedies, especially aspirin, are prescribed. In a few violent cases he has used lumbar puncture, which, when the cerebrospinal fluid is under increased pressure, seems to diminish the movements very promptly. In view, however, of the long time the disease has existed before it comes to us and the violence of the motor restlessness, it seems probable that several weeks' complete rest is necessary to overcome the irritability of the nervous system which must have been engendered, so that even if after a lumbar puncture all the symptoms disappear, it seems wiser to insist whenever possible on a three or four

weeks' treatment for the purpose of re-establishing the tone of the nervous system. Bailey has rarely found it necessary to give salvarsan.

Most of the patients who stay less than ten days leave for some reason other than that directly connected with the disease. In a few patients in whom choreic manifestations disappear within two or three days, the parents have taken the children home. Bailey does not feel, however, that ten days is sufficient time for the treatment of even mild chorea. The period between ten and thirty days is the one into which most of the cases fall. At the end of this period in the majority of cases no twitchings have been noticeable for some time, and the patient, so far he can see, is well, except for cardiac murmurs or lesions which may still persist. A few patients who have stayed longer than thirty days have either been cases of very long standing, or else are those in whom the chorea seemed merely another manifestation of a deeply embedded long-standing rheumatic tendency. Sleep after the first few days is generally very good, although some restlessness and talking may persist for a long period.

Bailey has been unable to draw inferences from the condition of nutrition. Some patients who do not do particularly well gain in weight; others in whom the twitching disappears rapidly lose weight; but in the majority there is no material change in weight during the stay in the hospital.

Relapses occur, but they are comparatively infrequent after hospital treatment. Only three patients have been treated in the hospital on repeated admissions. Bailey is further inclined to believe that relapses are rare, from the fact that only thirteen of the forty-eight patients discharged from the hospital have reported subsequently to the dispensary. Those who have thus reported, with two or three exceptions, have not been more than once or twice, and then only for some simple remedy. One patient came back after many months' interval to be treated, not for chorea, but for another

manifestation of rheumatic tendency, viz., erythema multiforme. Another came back, after several years of intermittent choreic symptoms, for treatment of a heart lesion; in this patient all twitchings had disappeared.

Bailey considers this result quite encouraging because so many patients have come to him with histories of previous attacks; several patients have had three or four.

His general conclusions from cases of chorea treated in the hospital are that by rest and seclusion, when the treatment is extended over a reasonable period, chorea can be permanently cured without much danger of a relapse, and in view of the general relapsing tendency of the disease, he feels that the treatment of chorea is one of the most important functions of a neurological hospital.

TREATMENT OF SEPTICEMIA.

In the *Interstate Medical Journal* for September, 1916, BERGHAUSEN points out that he cannot, in a short paper, discuss every detail of the treatment. It would be impossible to mention the names of the many remedies which have been proposed and employed. He therefore confines himself to a discussion of the more important factors in the management and treatment of septicemia.

A capable nurse, preferably two, should be in attendance, some one particularly skilful in managing near relatives and inquisitive friends. Careful instructions, as to her duties, should be given each day. She should be instructed to cleanse the mouth carefully. It is well to allow the patient to eat ordinary peppermint or wintergreen candy, although some of these patients do not care for it particularly. It serves to keep the mouth moist and fresh; it has some food value and may possess some antiseptic properties.

The patient should be treated as a consumptive whenever possible. Allow him to live in the open air; at least give him plenty of fresh air. These patients are placed in a crowded ward too often, or in a room

with closed windows. This is wrong, since fresh air supplies not only the needed oxygen, but also serves to lessen the symptoms of the nervous system; it induces sleep.

Septicemia is marked by an increased metabolism in all tissues of the body. We should attempt to meet this waste by feeding the proper number of calories. Very often, as in patients suffering from typhoid fever, the appetite is poor and no food is relished. We must encourage the patient and make the dishes as appetizing as possible. The nurse should be a good dietitian. If necessary, food may be given oftener and in smaller quantities. Add plenty of whisky to the favorite drink—our old friend, the egg-nog. Some newer forms of bottled liquid foods, as peptonoids and so forth, may be relished. Although we must feed the patient generously, it is just as important to prevent overfeeding and the consequent derangement of the digestion.

Besides the daily cleansing bath, an alcohol sponge for high temperature should be given. The ice bath is not needed; the so-called "fan bath" will do just as well for hyperpyrexia. The hot pack is indicated in septicemia marked by high temperature and erythema, and in the absence of the more serious complications; necessarily whisky, caffeine, or camphor should be given immediately before or after the pack. Allow the patients to remain in the pack ten or fifteen minutes; they usually perspire freely and thereby throw off the waste products.

When acute endocarditis has developed, an ice-bag may be employed over the heart. A cloth should be next to the skin and the weight of the bag lifted from the chest, if possible. As long as the ice-bag causes the pulse to become slower and more regular, it serves a purpose; otherwise it may just as well be discarded.

The application of direct heat serves a very useful purpose. The patients usually tolerate dry heat better than they do the moist. The electric pad, and an apparatus constructed with electric globes as the

source of the heat, can be conveniently applied to any part. They should be employed by all means to the lower abdomen in pelvic inflammation complicating pregnancy. Hot douches are well tolerated, and have great therapeutic value.

Many physicians advise against the use of preparations of the digitalis series when acute endocarditis has developed. Berghausen has found this complication no counter-indication to the careful use of the digitalis preparations. We may employ such preparations in the beginning to enforce the heart's action; we cannot thereby prevent the onset of acute endocarditis.

Caffeine preparations increase the heart's action and therefore the urinary output; possibly they prevent a heart paralysis.

Of the antipyretics, quinine is the most important. It should be used in small doses and often, since smaller doses increase, and larger doses paralyze, the leucocytic activity. Coal-tar derivatives should be cautiously used; aspirin is the safest.

Various preparations of silver have been employed and have been found useless, on the whole. Unguent Cr  d   has little more than a suggestive effect in Berghausen's experience. Collargol preparations have been used intravenously, but with little effect except in cases of septicemia due to the staphylococcus. Other antiseptic preparations have been used intravenously, apparently with the drawback that their dilution must be too great to secure safety in administration.

We all know that it is essential to have these patients drink plenty of water to secure active elimination through the kidneys and to make up for the increased loss of water through perspiration. Apparently good results have been obtained by hypodermoclysis by allowing large amounts of normal salt water to remain in the bowel after a cleansing enema, or by the drop method per rectum.

Antistreptococcic serum has little antitoxic and bactericidal value; it acts by so changing the bacteria that phagocytosis takes place more readily. Before deciding upon its use, we should be reasonably sure

that the streptococcus is the underlying cause of the infection. If no improvement follows the use of 50 or 100 Cc., discontinue its use or employ a serum obtained from another manufacturer. If the temperature falls to a point near normal following its use, then continue the treatment until every indication is present that the patient has definitely improved. According to the experience of most physicians, antistreptococcic serum has only occasional real value.

Berghausen's experience has been limited to the use of autogenous vaccines. These have been employed as a routine in addition to other therapeutic measures. He has aimed to prevent general reactions. Very often no local reactions will be obtained in severe infections. His experience has justified their continued use.

We must rely upon the judgment of the aural surgeon when to ligate the jugular vein in order to prevent the onset of septicemia following a mastoid operation.

Spinal puncture is indicated when symptoms of meningismus or meningitis develop. In serous meningitis we are enabled to make the proper diagnosis and prognosis by examining the spinal fluid obtained by the puncture.

When improvement has begun during the course of septicemia, we must still carefully examine the patient from time to time, to determine the possibility of a new complication. By proper hygienic and therapeutic measures we must combat an anemia or treat a heart weakened by the long-continued infection. A change of surroundings or climate is usually advisable.

THE RELATIONSHIP BETWEEN PELVIC DISEASE AND MANIC-DEPRESSIVE INSANITY.

The *American Journal of Obstetrics and Diseases of Women and Children* for September, 1916, contains an article by GIBSON in which he endeavors to show the value of operative procedures in certain cases of insanity. He concludes:

1. No mental improvement may be expected to follow an operation performed on

the pelvic organs of a woman who is suffering from a psychosis which is characterized by dementia.

2. An operation for the correction of lesions in the pelvis is justifiable in a woman who has manic-depressive insanity, and some improvement may be hoped for if the operation is performed in the first or second attack.

3. The pelvic pathology is not the cause of the psychosis but may act as the exciting cause of an attack in a woman of neuro-pathic stock.

4. The effect of the operation may be an indirect one by improving the general physical condition of the patient.

THE TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

In the *Archives of Internal Medicine* of September 15, 1916, WALKER and HALLER, in the course of a carefully prepared report of this condition and its treatment, state that patients with recent syphilitic meningitis and cerebrospinal syphilis may be relieved symptomatically by intravenous salvarsan; the spinal fluid Wassermann reaction may become negative with 1 Cc. and the cell count may become normal. Patients with long-standing cerebrospinal syphilis and tabes may be benefited symptomatically following salvarsan, but little or no change occurs in the spinal fluid findings.

Patients with recent and those with late syphilitic meningitis, cerebrospinal syphilis, tabes, and general paresis of the insane are markedly improved following the combination of intravenous salvarsan and intraspinal salvarsanized serum (Swift-Ellis method), and those who fail to improve under salvarsan alone do not improve either in symptoms or in spinal fluid findings following this double treatment.

That intraspinal salvarsanized serum greatly benefits patients with central nervous system syphilis is shown by the fact that those with negative serum reactions and with positive spinal fluid findings are symptomatically relieved by this treatment. In many patients the spinal fluid Wasser-

mann reaction becomes negative with 1 Cc., the cell count becomes normal, and a negative (Noguchi) globulin test is obtained following sufficient treatment with salvarsanized serum intraspinal without other medication.

SOME THEORETICAL CONSIDERATIONS ON THE PRESENT STATUS OF ROENTGEN THERAPY.

SHOHAN in the *Boston Medical and Surgical Journal* of September 7, 1916, claims that tuberculous lymphadenitis forms a particularly grateful field for the roentgen therapist. These cases, judiciously selected, yield to treatment almost invariably. In view of the good results reported by all observers and amply sustained by his own experience in a number of cases, he feels that it is an injustice to disfigure so many faces, when by means of roentgenization they could well be left unmarred. At least, it seems to him that every victim of tuberculous glands has a right to demand from us that we give him a chance by means of roentgen therapy to escape the scarring of the surgeon's scalpel.

PERIPHERAL NEURITIS FOLLOWING EMETINE TREATMENT OF AMEBIC DYSENTERY.

KILGORE in the *Boston Medical and Surgical Journal* of September 14, 1916, makes the following assertions:

1. Peripheral neuritis after emetine is not uncommon.

2. The symptoms most commonly met with in post-emetine neuritis are generally muscular pain and weakness, usually most pronounced in the legs, sometimes going on to paresis. One case is here reported of hyperesthesia of the soles of the feet without other symptoms.

3. The neurotic symptoms often develop after the emetine injections have been stopped, and may grow progressively worse for some time, with no more administration of the drug.

4. The total amount of emetine necessary

to produce neuritis varies greatly. The total amounts received by the cases recorded by Levy and Roundtree and those reported here are as follows:

Grains. Grammes.		
(a) Adult	19.5 (1.35)	Severe neuritis.
(b) "	6. (.39)	Severe neuritis.
(c) "	31.3 (1.40)	Mild neuritis.
(d) "	12.8 (.85)	Moderate neuritis.
(e) " about 10.	(.65)	Mild neuritis.
(f) "	15. (.95)	Moderate neuritis.
(g) Age 8	6. (.39)	Mild neuritis.
(h) " 7	5.5 (.36)	" "
(i) " 5	4. (.26)	" "
(j) " 4	4. (.26)	" "

On the other hand, many patients receive larger amounts and have no symptoms. On going over the records at the Shanghai Hospital for eighteen months, it was found that one white patient had received 13 grains (.85 gm.), three Chinese had 11 to 12 grains, and one 21 grains (1.35 gms.), with no symptoms of neuritis recorded.

5. The prognosis is good. The symptoms clear up gradually, usually over several weeks, leaving no traces apparent.

6. Experiments (now in progress) suggest that peripheral neuritis may be produced by emetine in healthy dogs.

A REPORT OF TWELVE CASES OF SPASMOPHILIA, WITH COMMENTS ON ETIOLOGY AND TREATMENT.

WEBSTER in the *Archives of Pediatrics* for September, 1916, states it is not his purpose to discuss particularly the many metabolism experiments that have been conducted in spasmophilic infants. That the balance of inorganic salts is disturbed is probable. That there is frequently acute water retention is certain. Acidosis of some kind and degree, he believes, is present, and the function of the parathyroids may be disturbed. The exciting cause, however, appears to be in the food.

On a diet excessive in carbon some infants show periodic disturbances, such as asthma and digestive crises; other infants give evidence of chronic disturbances of metabolism: for example, rickets and eczema. Commonly, he believes excessive carbon feeding through overenergy transformation produces a chronic acidosis. Under the

foregoing conditions he has frequently noticed an ammoniacal, often irritating, urine, also a lowered resistance to pyogenic infections, particularly furunculosis, styes, and pyelitis. Under similar conditions in his experience spasmophilia occurs.

The theory of Francis Hare that excessive carbon feeding gives rise to carbon accumulation, or an energy overplus which results in periodic explosion, is fanciful, but it gives an excellent working basis for the treatment of recurrent vomiting, bronchitis, and asthma in children, as has been expressed by Kerley. The same idea in Webster's judgment is applicable in spasmophilia, and similar treatment is effectual. The seasonal incidence and familiar character of spasmophilia are those of the periodic disturbances of children, and his experience leads him to believe that spasmophilic infants frequently show these recurrent disturbances later as children. It is his opinion, therefore, that spasmophilia occurs in infancy rather than other periodic explosions because the nervous system provides the most susceptible tissue.

In conclusion he would state his opinion that spasmophilia is due to overfeeding, especially of carbohydrate food, more especially in fermentable form, and that dietetic treatment is most effectual.

THE USE OF EMETINE.

REED in the *Boston Medical and Surgical Journal* of September 14, 1916, gives a general survey of our knowledge of emetine. He points out that ipecac enjoys a well-deserved reputation as an expectorant, where by virtue of the milder symptoms of nausea, which it excites, it causes a flow of bronchial secretion, coats over irritated, dry, inflamed membranes, and has a definite beneficial effect. In so far as emetine excites mild nausea, it shares in this action. Wild called attention to this use of emetine in bronchitis and catarrhal affection of the respiratory tract in 1895 (*Phar. Journ.*, i, p. 435, 1895). Evidently the old emetine, with its contamination of cephaelin or ipecamin, would serve better for this pur-

pose than the purified alkaloid. Also, in the light of our increased knowledge of the pharmacology of the ipecac alkaloids, the older galenical preparations would seem to have certain definite advantages over emetine itself for this purpose.

Emetine has been lauded as almost a specific for hemorrhage in certain chronic diseases, especially for hemoptysis in pulmonary tuberculosis. Some have advocated it as a remedy for hemorrhage in typhoid, diabetes, and other conditions. There is no experimental evidence that emetine has the slightest influence on hemorrhage directly, or that under any circumstances it promotes coagulation. The observation of Howell has been quoted, that emetine in animals causes a soft, jelly-like clot, with no fibrous structure, and that the coagulation time is notably prolonged. These definite data are pitted against no small number of purely clinical observations, with no scientific controls, and even with no careful appraisal of concomitant treatment, or of the possibility of the very frequent improvement which occurs spontaneously in hemorrhage in spite of or without any form of treatment.

It is to be remembered that emetine lowers the blood-pressure and weakens the heart. This, together with the depression of the central nervous system which is produced, might well result in an indirect alleviation of hemorrhage, but this is not the claim of those who see in emetine a specific and direct remedy for hemorrhage. Kunkel (quoted in the *Journal of the A. M. A.*, Nov. 13, 1915, p. 1730) recalls an earlier belief that emetine caused anemia of the lungs and therefore tended to relieve hemoptysis and to have a beneficial effect on pulmonary tuberculosis. He traces this belief to the observation that the pulmonary vessels of animals killed by emetine were empty, a condition really attributable to splanchnic dilatation and drainage of the blood from the lungs. This explanation of the effect of emetine on hemoptysis thus calls in the lowered blood-pressure of emetine, but goes on to claim pulmonary anemia as beneficial, when the opposite is now recognized, as, for instance, the rare asso-

ciation of pulmonary tuberculosis with a leaking left heart.

The idea of emetine as a remedy for hemoptysis originated apparently in France. Flandin and Joltrain, for example, made a report in the *Presse Médicale*, in April, 1913, regarding the value of emetine in tuberculosis. Raeburn, in the *British Medical Journal* in the following year (p. 703), followed with an enthusiastic report which speaks for itself. He divides his cases for emetine treatment into three groups: (1) Bronchitis, where no tuberculosis could be demonstrated. If the heart was in good condition, these cases usually showed improvement, which generally continued after the emetine was stopped. This is surely far from conclusive, as the natural rejoinder is that if ipecac had been used in the place of emetine, improvement might well have been still faster. (2) Cases of clinical tuberculosis with no tubercle bacilli in the sputum. Raeburn here admits that improvement might have been charged to diet and hygiene, but thinks there was a really beneficial action in the congestive stage. (3) Cases with tubercle bacilli in the sputum. Here his results were much less regular, and he draws no conclusion of specific improvement. One may conclude justly that the emetine showed its only beneficial effect in the cases of bronchitis and in tuberculosis where the bronchitic symptoms were prominent, and that it was the expectorant action of emetine which aided, and not any direct influence on the tuberculous disease. In some twelve cases of hemoptysis in which emetine was administered, all in advanced pulmonary tuberculosis, Reed has failed to see any favorable effect which could not be explained by other factors more plausibly than by the emetine.

To summarize, then, in so far as emetine has a beneficial action in tuberculosis, it would seem to be due to its expectorant properties, and if so, other preparations are preferable. In so far as emetine has a beneficial action in hemorrhage, it would seem to be due to the indirect result of decreasing blood-pressure, and if so other drugs would be more effective, in that they

would produce a similar result more safely and without the specific action of emetine on coagulation.

APOCODEINE — A NEW LAXATIVE WITH EXCEPTIONAL ADVANTAGES.

The *California State Journal of Medicine* for September, 1916, contains an article by ALVAREZ in which he calls attention to this use of apocodeine, a use which was suggested many years ago.

It is well known that most of the opium derivatives have, besides the sedative effect on the nervous system, a stimulant effect on the bowel. To be sure, some cause constipation, but, as has been shown for morphine, this may be due to too much stimulation, resulting in localized spasms. Codeine acts like a purge on animals. Looking over the literature on this series of drugs, it seemed that apocodeine was the most promising one for his purposes. For those who have never heard of it, he will say that it is made from codeine as apomorphine is made from morphine. Just as apomorphine has much less of the sedative action and much more of the emetic action of morphine, apocodeine has lost most of the sedative action and has gained more of the laxative effect of codeine. Besides, it has a pronounced nicotine-like effect, paralyzing the sympathetic nerve cells and blocking inhibitory influences to the bowel. It also improves the tone of the intestinal muscle, and by vasodilatation improves its blood supply. This again favors increased peristalsis. Certainly it has the most laxative effect of all the opium derivatives.

Discovered by Matthiesen and Wright in 1870, it was tried out on a few patients in England and in France. Some thought it would be a good expectorant. Others found that it was an excellent hypodermic purgative that could be given, for instance, to the violently insane. Since then it has remained a laboratory drug, unknown to the profession, but used by physiologists when they wish to paralyze sympathetic ganglia.

Three years ago Alvarez obtained some

of the drug and soon found that it worked very well with a dosage of from 1/15 to 1/10 of a grain. Ordinarily he has given it with atropine in the following prescription:

R Apocodeinæ hydrochlor., gr. 1/15 to 1/10;
Atropine sulph., gr. 1/200 to 1/150;
Sacch. lactis, gr. ij;

Ft. caps. tales No. xv. Sig.: One b. i. d. or t. i. d. p. c.

He seldom exceeds the smaller dose of atropine, as many people who need the apocodeine are so sensitive to drugs that even gr. 1/150 makes them uncomfortable.

In suitable cases, such a capsule taken two or three times a day will insure a normal, formed stool without any discomfort. In three years only three people, all of them very sensitive to drugs and to nervous influences, have had to complain of anything more than this mildly laxative effect. They were purged quite actively without griping or other discomfort. When the drug works well there is no need of increasing the dose. A number of people have taken it pretty steadily for three years and still get good results from 1/15 grain twice a day. Many have remarked upon the ease with which they could taper off and discontinue its use. There is none of that fatigue and emptiness of the bowel which interferes so much with the resumption of normal activity after purgatives.

Although as an opium derivative the drug happens to come under the Harrison Act, there is no danger of habit formation, as apocodeine gives none of that feeling of well-being and comfort that makes the chance user of morphine wish to repeat his experience. Alvarez can state positively that in the three years no patient has shown any tendency to habituation.

Alvarez wishes to emphasize the fact that apocodeine is not a sure cure for constipation. We cannot expect it to work well when the trouble is due to binding adhesions, pelvic disease, or some form of megacolon. Besides, it has failed in some of the cases that seemed eminently fitted for its use. Possibly larger doses would have worked, but he has never exceeded 1/10

grain three times a day, for two reasons: one that he often had cause to suspect that the case was not suitable; the other that, especially since the war began, the drug has been expensive (seventy-five cents a grain, dispensed). A greater experience with the medicine and a better knowledge of the mechanism of constipation may give us an explanation for these failures. In a few cases in which neither liquid petrolatum nor apocodeine worked well enough separately, their combination brought about a most satisfactory action.

THE USE OF SALT SOLUTION BY THE BOWEL (MURPHY METHOD) IN INFANTS AND CHILDREN.

The *Archives of Pediatrics* for October, 1916, contains an article by GRAHAM in which he tells us he has been greatly impressed, although not surprised, by the excellent results following the Murphy treatment in profuse diarrhea due to intestinal infection and in the summer diarrhea of children, the symptoms being greatly relieved when the fluid lost by the bowel was replaced. Its use in dysentery is being more widely adopted each year, while in Asiatic cholera Michael found that 40 per cent of the cases treated with saline infusions recovered, while only 22 per cent of those not so treated showed any improvement.

A loss of body fluid from persistent vomiting or any other cause can be replaced in whole or in part by normal saline solution, injected into the bowel and then absorbed. Graham finds, too, in slow proctoclysis an invaluable aid in the treatment of cyclic vomiting, pylorospasm, pyloric stenosis, and esophageal stricture, although in the two conditions last mentioned nutritive enemata must sometimes be given alternately with the injections of salt solution in order to maintain the nutrition.

His experience with the Murphy method in treating pylorospasm has been very gratifying, and in the case of a twenty-five-days' old infant with severe jaundice, persistent vomiting, and diarrhea, the stools

being largely composed of mucus, which was black, the employment of the Murphy method, as a last resort, was followed by speedy recovery.

Fischer has had occasion to employ the Murphy treatment in erysipelas, and advocates its use when there is marked toxemia and high fever. It has also been used in typhus fever.

Graham regards the infusion of normal saline into the bowel by the drop method as a most valuable aid in the treatment of all the exhausting diseases of infancy and childhood, and believes that by its stimulating effects threatened collapse can often be averted. In feeding children and infants who cannot retain nourishment given by mouth, a nutrient enemata given drop by drop is often better retained and absorbed than when given more rapidly.

Sugar solution has recently been given by proctoclysis in cases of diabetic acidosis, in an effort to promote continuous absorption, and in some instances the acidosis disappeared.

Lesné administers artificial serum by proctoclysis, giving 50 to 100 Cc. of isotonic serum, or 4 per cent of sugar solution, and claims that absorption is afterwards as rapid as when these fluids are injected subcutaneously. He also reports excellent results in children of all ages suffering from gastroenteritis, cyclic vomiting, acute alimentary anaphylaxis, and typhoid fever. He states that, where urotropin or adrenalin was added, the action of the drug was better by rectum than when given by mouth.

Proctoclysis in puerperal fever and in surgery is familiar to all in the profession; but experience has shown that it is even more effectual in the treatment of surgical conditions in children than in adults. Not only does it greatly relieve postoperative thirst and nausea, but after hemorrhage from the esophagus, intestines, or lungs, and when operative or traumatic hemorrhage has produced only mild symptoms, the absorption of large quantities of saline solution from the bowel quickly replaces the fluid lost by hemorrhage.

There are three essential points in giving

salt solution by the Murphy method: First, the solution must be under very low pressure; second, there must be a free to-and-fro movement between the reservoir and rectum; third, the solution must be warm when introduced.

To guard against too great pressure on the fluid, the reservoir containing it should not be elevated more than 12 inches above the hips, and the tube carrying the fluid to the rectum should be compressed so that the solution will trickle into the rectum drop by drop, a half-pint escaping in this manner each hour. The hips should be slightly elevated, and a medium-sized catheter may be introduced four or five inches into the bowel, or a glass tube may be used.

To secure the ready absorption of the fluid, the solution should be at a temperature of 98° to 100° F. when it enters the rectum; as it cools it is taken up less quickly by the bowel, and at 60° F. absorption is much retarded. Since the solution cools while passing from the reservoir to the rectum, the fluid in the reservoir should be kept at a temperature of at least 110° F., this being accomplished by surrounding the irrigation jar with hot-water bags. A pint of solution is placed in the reservoir every two hours, and, at the end of an hour, when one-half of it has trickled into the bowel, the flow is checked for an hour, so that the bowel may have a rest.

Where there has been great loss of fluid, it may be necessary to inject the saline much more rapidly.

One must be careful, however, not to overdistend the bowel, for, although distention is the normal condition of the intestine, overdistention will expel the solution.

It is also possible to give by this method so much fluid that it will produce general edema and pulmonary congestion. Therefore, whenever slight edema of the tissues is noted, the treatment should be discontinued until this disappears, when, if necessary, the infusions may be very slowly resumed.

The preparation of the saline solution is

a matter of no little importance, although it frequently receives but little consideration. The usual custom is to dissolve a teaspoonful of table salt in a pint of water, which is, at best, an extremely inaccurate method of calculating, since a teaspoonful may be from 100 to 300 grains, according to whether it is a level or heaping teaspoonful.

In addition to the drachm of sodium chloride, some authorities dissolve a drachm of calcium chloride in each pint of solution. Recently the use of ordinary tap water has been suggested in place of normal saline, since it is quite as readily absorbed, and in high fever, or when the rectal temperature is high, relief has been afforded by injections of tap water unheated.

The length of time proctoclysis should be continued varies with the aspects of the case. In children, especially, it depends upon how they tolerate the presence of the tube within the rectum. In infants the mere fastening of the tube to the buttocks with adhesive strips will suffice; but older children must be persuaded to allow the tube to remain, for it may be so annoying that a sick child will try to pull it out.

The usual duration of this treatment is from four to six days; but if the rectum is not unduly irritated, and the indications warrant it, proctoclysis may be kept up without interruptions for ten days to two weeks.

THE USE OF PHYLACOGENS.

DOYLE in the *Louisville Monthly Journal of Medicine and Surgery* for December, 1916, points out that before making use of this agent it is absolutely essential that an accurate and definite diagnosis should have been made. No one is any more justified in using, for instance, rheumatism phylacogen in a "suspected" case of rheumatism without determining the special type of rheumatism, or that it is a case of rheumatism at all, than he would be in injecting a dose of strychnine in a case of high arterial tension without first determining that the strychnine was thoroughly and properly indicated in the case; or to administer a

dose of quinine in a case of anemia without full justification for its administration. Not infrequently is the failure to obtain results with phylacogen attributable to no other cause than that of improper and inadequate diagnosis. This fact is frequently illustrated in "referred" cases. The physician will tell you he has "a case of rheumatism" and that he has used rheumatism phylacogen, and there has been no improvement. On investigation and examination it will be found that the patient has not ordinary rheumatism, but will exhibit symptoms of and have all the laboratory confirmations of gonorrheal involvement, and many will present the various "plus" of the Wassermann reaction. In such cases it is easy to see why rheumatism phylacogen had failed to produce results. In gonorrheal cases gonorrhea phylacogen promptly produces the desired and expected results; and in other cases proper treatment will give prompt relief.

Now it is not meant, nor does Doyle believe that any one ever intended to say, that this remedy is a great "cure all" in every case wherein it is properly used. Correctly administered in the right cases it will cure or markedly improve the vast majority wherein it is properly indicated. While all of the instances wherein failure to make diagnosis or wherein it has been incorrectly used have not been cited, he is quite sure that what he has already said is sufficient to bear out the statement that correct diagnosis is absolutely necessary.

Many mistakes are made in the failure to properly administer the remedy and to continue its administration over a sufficient length of time. Many cases have been observed wherein splendid starts have been made toward marked improvement, and either a misunderstanding of the action of the remedy, a disinclination to persevere in well doing, or ignorance concerning the action of bacterial derivatives within the human, has caused the attending physician to discontinue the use of the remedy entirely too soon. Others fail to obtain results because of the fact that they are overzealous and a bit too enthusiastic concerning

the effect of a "new" remedy which they are about to use for the first time, and consequently in their overenthusiasm they give or use too large an initial dose. It is always advisable to begin on a smaller dose and study the patient's reaction and tolerance before making use of a larger dose. If one would be content to "make haste slowly" far better results would be obtained here as in other lines of therapeutic endeavor. There is a growing belief, which is undoubtedly well founded, that some individuals possess idiosyncrasies to vaccines, bacterial derivatives, and serum, just as some have to other therapeutic agents. Doyle holds, therefore, that one is no more justified in giving a large initial dose of any of these agents, without first learning the tolerance, than he would be in giving a huge initial dose of quinine in a case wherein the tolerance is not known.

Experience in "vaccine" work teaches us that one very great element is constantly overlooked. Doyle refers to the specific or individual blood content. In the rarest instances are there changes or early improvement produced in all of the blood elements. Improvement of the entire blood content is most desirable. Consequently the work is always supplemented by the administration of those agents which deal with the improvement of the entire blood picture. Because of the splendid results obtained, the chief supplemental aid consists in the intramuscular injection of the arsenite of iron and strychnine. Many cases which have apparently improved slowly in all kinds and types of vaccine therapy have shown a remarkable rate of improvement on the addition of properly selected tonics.

Experience has proved that the intravenous method of administration is vastly superior to any other form of phylacogen therapy. While the reaction, if any, appears early, it is not so prolonged nor as severe nor as displeasing to the patient as when given intravenously. Not as large a dose is required. Studies of the blood have proven more marked changes of a beneficial nature follow intravenous dosage than are seen following the intramuscular method.

To sum up, it is easily seen that correct and adequate diagnosis, proper selection of the phylacogen remedy, plus careful observation of the patient, his tolerance, and reaction, are essential in this particular line of therapy, and it is close observation of these conditions that will do much toward obtaining results which may always be expected when phylacogens are used. Doyle is deeply interested in this subject. The results have been constant, and he might say, with pardonable pride, brilliant and certainly most satisfactory both to patients and himself.

SOME PRINCIPLES OF INVESTIGATION IN BLOOD-PRESSURE PROBLEMS.

In the *British Medical Journal* of September 23, 1916, McQUEEN asserts that a study of the literature of blood-pressure measurements cannot fail to impress the reader with the lack of method shown by some clinicians in the choice and arrangement of their observations. A measurement of blood-pressure—in most cases the systolic—is chosen as an item in the routine examination of the physical features of a clinical case. Let us consider what knowledge is really obtained by taking the systolic blood-pressure. The information contained is no more than that during the period of observation the systolic pressure was equal to the weight of a column of so many millimeters of mercury; it may be a high blood-pressure, or it may be a normal blood-pressure during systole. When the systolic pressure only is estimated, the maximum height to which the pressure rises during so many beats of the heart is given, but nothing whatever is shown as to how far it sinks during diastole, nor as to the extent of the swing of pressure between each diastole and each systole of the heart. In the laboratory to record the blood-pressure changes with the maximum manometer alone would be at once recognized as futile.

In recent years some observers have added an estimation of the diastolic pressure, and by subtracting the prevailing diastolic pressure from the prevailing sys-

tolic pressure a record of the pulse-pressure range is obtained. To these data they have added observations on the rate of the heart-beat and the rate of the respiratory rhythm.

When this information is available we have an isolated picture of the heart's activity, and can say that each contraction of the left ventricle is able to add to the existing diastolic pressure a certain increment of pressure, and this increment of pressure delivers a shock to individual organs—for example, the kidneys; that this shock is borne by the walls of blood-vessels which are already under a certain measured existing and permanent strain, the diastolic pressure.

Such measurements are complete, but a thorough knowledge is not thus obtained of the circulatory phenomena involved in any disease when such observations are carefully made and carefully recorded from day to day.

The feature to be studied in the circulation in health and in disease is the power of the heart in conjunction with changes in the peripheral blood field to adapt itself quickly and efficiently to extra strain. In health every one is constantly making calls on the power of the heart and peripheral field to adjust themselves either to extra strain or to diminished strain. Consequently, although advance is made when the scope of the measurements of the clinicians is broadened from isolated measurements of systolic pressure and pulse-rate to that of systolic, diastolic, pulse-pressure range, rate of heart-beat, rate of respiratory rhythm, these measurements are still measurements made under the uniform conditions of repose on a bed in a hospital ward.

Physiologists appreciating this point have published observations of blood-pressure before and after muscular exercise in healthy subjects. Thus, Pembrey has made a series of interesting observations. Records have been taken of blood-pressure before and after running and before and after the lifting of heavy weights. Such observations, though useful, are also incomplete, because they do little more than serve to show what changes have taken place in the

blood-pressure after the exercise is over. They vary with the power of the circulatory system to adapt itself quickly to the change from activity to repose. As all measurements take time to perform, and as the circulatory system in healthy individuals has great power of rapid adaptation, the conclusions drawn from the measurements are apt to be vitiated.

Consequently if a satisfactory knowledge of the heart and peripheral circulatory system in the human subject in health and disease is to be gained, it is necessary to examine and record the changes in systolic, in diastolic, pulse-pressure range, rate of heart-beat, rate of respiratory rhythm, during the strain thrown on the heart by exercise, not after it is over. The systolic pressure can be estimated during exercise either by the auditory or the tactile index, but the diastolic index is estimated by the auditory index alone. Consequently it is best, perhaps, to adhere to the auditory index for both measurements. Previous to the outbreak of the war McQueen had found in Aberdeen that it was impossible to get satisfactory observations of systolic pressure, diastolic pressure, rate of heart-beat, and rate of respiratory rhythm in a series of medical students who kindly volunteered their services. As the auditory method is used the work done must be such that the arms of the individual tested should be reasonably rigid and that the exercise should produce as little noise as possible. The subject was placed on his back on a polished table, and the exercise consisted in rhythmically drawing up his feet and legs as in swimming on the back. The mildness of this exercise depends on the length of time that it is kept up.

It was thus possible to draw graphs of the systolic and the diastolic pressure, with observations on the rate of the heart-beat and the rate of respiratory rhythm during the exercise. It is true that the observations of systolic and diastolic pressure cannot be made simultaneously, especially with increased rate of heart-beat. But when such observations are numerous, and are plotted alternately over a considerable

period, the importance of taking them simultaneously is practically *nil*.

Such graphs give a true picture of the response of the heart and of the peripheral system to a given amount of work over a given period of time. We can trace how the circulation as a whole adapts itself to the changed conditions.

It is also possible to examine the circulatory phenomena during exercise in the erect posture by the auditory method. The exercise employed was the working of a heavy but silent lathe with one foot. Such graphs enable us to see how the heart adapts itself to gravity and to exercise simultaneously, and from such graphs the efficiency of the mutual adjustments of the heart and of the vasomotor system can be tested.

The ranges of blood-pressure, both systolic and diastolic, in healthy and in unhealthy subjects vary greatly. It is obvious, then, that the response to a given amount of work of normal adults with a blood-pressure of, say, 130 systolic, 75 diastolic, and a rate of heart-beat of, say, 78, should be investigated. Having established the normal graphs, the investigation should be carried on cautiously in people with abnormal systolic and diastolic pressures. By so doing we may learn to appreciate what is the real significance of any abnormal blood-pressure range.

Translating these problems into more concrete form, we may ask how a subject, whose diastolic pressure is originally high, fares when tackling a given amount of work. We know that, theoretically at least, he starts with the disadvantage that a considerable amount of cardiac energy in excess of the normal has to be spent in opening the aortic valve. Or we may take the case of aortic incompetence with initial high systolic pressure and initial low diastolic pressure, and ask what series of blood-pressure changes take place during exercise. Does such a case develop during exercise a high diastolic pressure in spite of incompetent valves? McQueen puts these questions simply to show that in the whole of the literature of blood-pressure we have no guide to the true significance of blood-

pressure ranges which depart from the normal. We have never isolated these departures from the normal and tested them against the performance of a given carefully graduated amount of work. We do not know how nature has adapted both the heart and the peripheral circulatory system to overcome initial defects. We may state that breathlessness on exertion is a cardinal symptom, but has the case developed this breathlessness on exertion because the heart has failed or because the adjustments his peripheral circulatory system can make are inadequate?

[We reprint this article because it has such an important definite bearing upon the administration of cardiovascular tonics and sedatives.—Ed.]

RETRACTION OF THE UTERINE MUSCLE ASSOCIATED WITH OBSTRUCTED LABOR.

HICKS in the *British Medical Journal* of October 14, 1916, would make the following suggestions in regard to this obstetrical condition:

1. Be on your guard when dealing with a short, thick-set woman with a square head and short long bones.

2. A high position of the fetal head, occurring in a primipara, should at once denote serious trouble.

3. Measure the diameters of the pelvis, but do not place too much store upon your estimate. The brim may be obliquely distorted, and this will prevent the head from entering the brim, and at the same time will not show up in your calculations.

4. Cut-and-dried rules on pelvimetry are useful only in severe contractions of the pelvis.

5. Remember that to apply forceps to a fetal head which is movable and high above the brim is an obstetric operation requiring the most careful consideration, and should only be undertaken after careful examination of the condition of the uterine muscle around the neck of the fetus. If the examining hand can be passed easily beyond the shoulders of the fetus, an attempt at delivery with instruments may be made.

If there is the least evidence that the uterine muscle is retracting round the neck of the fetus, Cæsarian section should at once be performed.

6. When once the retraction ring has formed around the neck of the fetus, it will grip it firmly until the mother is almost at the point of death.

THE MORPHINE-HYOSCINE METHOD OF PAINLESS CHILDBIRTH.

In the *British Medical Journal* of October 14, 1916, HAULTAIN and SWIFT of the Royal Maternity Hospital in Edinburgh give us their views as to the value of this plan of treatment. The following is a summary of special points which they think are most important:

1. In the case of a primipara the first injection must not be given too early, as it tends to stop the pains. The rule of giving the first injection when the os admits two fingers, and the pains are regular, is a useful one. In the case of a multipara, however, the injection cannot be given too early after the pains have started. It is generally found that the first injection is given too late.

2. The second injection, namely, the first $1/450$ grain of pure hyoscine, should be given about an hour after the initial injection, whether the patient is well under or not. If this injection is delayed the effect of the morphine tends to wear off, and the future injections of hyoscine will not take effect.

3. The injection can with safety be repeated either at hourly or three-quarter-hourly intervals.

4. Do not repeat the morphine in the latter part of the second stage or the child will most probably be born oligopneic. If the hyoscine is not taking effect, then it is well to give the mother a slight whiff of chloroform; thus the hyoscine is allowed to work and the patient gets again into the condition of "twilight sleep."

5. The patient's friends must be kept away from the room, which ought to be quiet and darkened.

6. Patients, if thirsty, must be given water to drink.

7. Remove the baby to another room after birth, so that the mother cannot hear the cries, otherwise she may remember the cry and so piece together and imagine her whole labor.

From their experience Haultain and Swift think it may be stated that we have a safe and efficient means of managing labor painlessly in the majority of cases. It requires, however, the constant attendance of a competent attendant. This rôle can be efficiently undertaken by a reliable nurse under supervision, which makes its adoption in better-class private practice possible to the medical practitioner.

It is of special value in primiparæ, in whom as a rule the first and second stages of labor are long and painful.

It is also of great value in a prolonged second stage, due to a large head or slightly contracted pelvis, as it allows of head molding without unduly exhausting the patient.

So far as amnesia is concerned, it is of little use to commence the treatment during the second stage.

The strength of the uterine contractions is not diminished, hence its advantage over chloroform. There are no contraindications to its use beyond extreme restlessness, which is very exceptional, and probably due to an idiosyncrasy.

The absence of exhaustion after even a long labor is one of its greatest advantages.

Thirty-seven of the forty patients rose from bed on the third day after labor.

It is regrettable that such a great deal of publicity has been given to the subject, and that prominent specialists have allowed themselves to be exploited through the lay press, as the lay community suffers from the want of knowledge and sense of proportion which allows of an estimate of its value under various conditions, and is therefore too apt to attempt to force the hand of the careful practitioner. At the same time, the method of management of labor is so good from the point of view of relief of suffering, that it may help materially to bring about the increase of the birth-rate so much

required, which is perhaps the only argument in favor of publication in lay journals, etc.

[The best obstetricians in America disapprove of this method of dealing with labor.—Ed.]

THE ADMINISTRATION OF CERTAIN DELIQUESCENT AND LIQUID DRUGS IN CAPSULES.

In the *Journal of the American Medical Association* of October 14, 1916, DAVIS points out that as it is so much pleasanter to take medicine in capsules than in other ways it has been his habit when he can do so to administer it in them. Pharmacists find it impossible to dispense extemporaneously in capsules many deliquescent substances and most liquids. A dozen or more years ago his attention was called to the possibility of dispensing many such substances in a capsule by using a wax mass. In this way potassium iodide and similar drugs can be given, also guaiacol, oil of sandalwood, and many other liquids which one wishes to prescribe in doses of from 5 to 10 minims. The iodides can be given in doses of 10 or 12 grains (from 0.5 to 0.8 gm.), and the mass will be readily absorbed, as is shown by finding iodine in the saliva in three minutes or less after such a capsule is swallowed.

The capsules are permanent, keeping for weeks ordinarily and in the hottest, dampest weather, if placed in a corked bottle.

For the making of a pill to be placed in a capsule containing sodium or potassium iodide in doses of 10 or 12 grains (from 0.5 to 0.8 gm.), about $1\frac{1}{2}$ grains (0.1 or 0.15 gm.) of the wax mass is needed. Red mercuric iodide and other drugs can be incorporated in the same mass if they are required.

To make a pill containing guaiacol, oil of sandalwood, or similar liquids in doses of 5 minims or thereabouts, the same quantity of mass is needed.

Davis has often given iodine incorporated with this mass, and has obtained from it as prompt and as good results as when it was given in solution. But he has found it

possible to give it, without discomfort to patients, in larger doses. For instance, from 2 to 4 grains (from 0.15 to 0.25 gm.) can be given in this way, though he rarely has given more than $2\frac{1}{2}$ grains at a time. He has made it a practice to dilute the iodine well with the mass in order that the pill may not cause gastric discomfort, and possibly he uses more of the mass than is necessary for this purpose. He usually prescribes at first 1 or 2 grains (0.05 or 0.10 gm.) with 5 grains (0.3 gm.) of wax mass. Undoubtedly, the oil in the mass is responsible for carrying the iodine and for diluting it and releasing it so as not to cause gastric discomfort. When administered in this way, iodine appears with its usual promptness in the saliva. Cascara, aloes, codeine, and many other drugs can be incorporated with it when they are needed.

The wax mass is made of one part beeswax and three parts of castor oil. These ingredients are melted and mixed by heating them gently. When liquefied and thoroughly mixed, the mass is allowed to cool. It makes a somewhat granular pill. Davis does not know who invented the mass, and he has rarely found a pharmacist who knew of it.

He has never seen the castor oil produce looseness of the bowels, and it would not be expected to, so little of it is administered at a time.

Guaiacol and oil of sandalwood and similar substances can be readily mixed with from one-half to equal parts of beeswax and made by gently heating into a mass. Such a one, however, is needed only when a prescriber is using these substances with frequency.

BLOOD-PRESSURE.

The Prescriber for October, 1916, contains an article by LUKE in which he discusses this subject. He states that as regards alcohol and tobacco care is necessary, and the strictest of moderation, if not complete abstinence, should be observed. So far as alcohol is concerned, its action as

a diuretic is rather favorable, but, on the other hand, the initial rise of blood-pressure caused by it is undesirable, and in advanced cases may be dangerous. A mild cigar after dinner, or two or three pipes a day, may do no harm, but where there is cardiac irregularity are best done without. Constipation of the habitual kind is one of the most potent factors in sending up and maintaining a high blood-pressure, and should by every means be avoided. In his own experience and that of most physicians men are much less prone to this than women, and less apt to become resigned to it. In women it often starts at badly managed schools, is again encouraged when menstruation starts from a reluctance to disturb "dressings," and is further enhanced by marriage and the occurrence of pregnancy. If it exists, however, from any cause in the patient under observation, it should be combated by every possible means. Apart from drugs, which are chiefly palliative, he has found sinusoidal currents to the bowel most curative. On the whole one prefers some mineral water with adequate proportions of sodium and magnesium sulphates, and the weekly or biweekly administration, for a time at least, of calomel and the pill of colocynth and hyoscyamus. The Carlsbad sprudel salt suits some people remarkably well, but there are many artificial salts and waters that are quite admirable. Kruschen salts Luke has a great respect for, as some hundreds of patients have found it "just the thing." There is no doubt that an annual visit to any spa with purgative waters, together with regulation of diet, quite apart from any general treatment, has a most excellent effect on blood-pressure in cases past middle life. Women drink too little at all times at home, and they drink waters either purgative or alkaline in appropriate quantities at a spa, and probably keep up the habit more or less when they return home.

So far as drugs are concerned, a plebiscite of the profession would find an overwhelming majority for potassium iodide. And yet now and again one finds patients

very much annoyed at having an iodide headache, and lacrimation substituted for "pressure in the head," a condition necessitating change of medicine, or, if they will allow you, adjustment of the dose. As regards organic iodine compounds (iodipin and the like), Luke's impression is that though they are free from tendency to produce unpleasant effects, they are less efficacious therapeutically.

Sodium nitrite he has very little experience of, and thyroid extract, at all times varying greatly in its effect on the individual, he has not used in hyperpiesis. Nitroglycerin and liquor trinitrini are more suitable for cases in which the symptoms are acute. To the average person with a moderately raised pressure the first obvious sensation produced by nitroglycerin will often be a very distressing headache, which is regarded as more than counterbalancing the possible benefit.

The somewhat ancient and heroic process of venesection is also rather to be reserved for severe cases in which symptoms are acute, but in the experience of many it gives great and immediate relief. Calomel or blue pill is often helpful, and Broadbent spoke highly of it in cases of insomnia due to high blood-pressure.

But in all these considerations one has to bear in mind that one's efforts are directed to amelioration of the condition, relief of symptoms, and prolongation of life, rather than to effect a cure of the underlying condition.

THE EXCRETION OF HEXAMETHYLENAMINE BY DAMAGED KIDNEYS.

In the *Boston Medical and Surgical Journal* of October 19, 1916, G. G. SMITH reminds us that in a previous paper on the excretion of formaldehyde in the urine, he stated that "the kidneys of chronic nephritis, to judge from a few observations, excrete urotropin much more slowly than do normal kidneys. One dose of 15 grains has given traces of formaldehyde in the urine for thirty-six hours." From the very limited number of cases of nephritis which he has

studied in this connection, it would appear that serious disease of the glomeruli greatly decreases the ability of the kidneys to excrete hexamethylenamine. The diminished excretion of this drug in chronic glomerulonephritis does not affect the position of hexamethylenamine in the treatment of renal infections because, according to Cabot and Crabtree, colon infection affects the epithelium of the tubules. Excretion of hexamethylenamine by the glomeruli is not interfered with, and the drug is put out in good quantity.

In view of the above findings, Smith believes that the statement of Falk and Sugiura in regard to the low output of hexamethylenamine by kidneys with impaired function is of very little practical importance. Close analysis of their paper shows several probable sources of error in their procedure, and these errors all tend to represent the urotropin output as less than it really is. Of the 24 pathological cases studied by them, 12, or one-half the number, fail to present evidence of any value pointing to true renal disease. These 12 cases, furthermore, show a lower output of urotropin than do the 12 cases of renal disease in the same series.

No conclusion as to the value of urotropin in those cases in which it might be expected to do good can be drawn from the work of Falk and Sugiura.

As positive evidence on the question of the output of urotropin by infected kidneys, Smith has presented facts drawn from a study of 10 cases of undoubted renal disease of this type. In every case urotropin was excreted; in three cases, in a strength of 1-10,000; in two, 1-30,000; in one, 1-40,000. It was weaker in the other four, although strong enough to give a definite test with Burnam's method. In chronic nephritis of advanced degree he has found in three cases a diminution in the output of urotropin, which would be a serious factor in its employment as a therapeutic agent. Fortunately, in such cases it need seldom be employed. In kidneys damaged by infection, even to a very marked degree, the drug may be excreted in a strength as high as

1-10,000. One must bear in mind the very important fact that no matter how much urotropin is excreted, it will be useless as a bactericide unless it is broken up into formaldehyde by urine which is definitely acid.

CHLORINE AS A THERAPEUTIC AGENT.

HALLDORSON in the *Journal-Lancet* of October 15, 1916, gives a short account of his experience with chlorine in the form of the U. S. P. solution for the last ten years, or since he first began to make use of it, in August, 1906.

He first tried it as a last resort on a patient in the third stage of pulmonary tuberculosis—surely a severe test of the usefulness of any drug. Its effect was so unmistakable and the improvement of the patient was so rapid and persistent that in six months her condition seemed to warrant a belief in an ultimate recovery. She died in March, 1909.

As a matter of fact, the first results from the use of this remedy were so uniformly good that in his ignorance and inexperience Halldorson began to imagine that the long-looked-for "cure for consumption" had at last been found. It is needless to say that he has long since gotten away from that idea. Nothing short of the elixir of life itself will ever prove a specific for an infection of such endless variety, in kind and proportion, as the one commonly known as pulmonary tuberculosis, where, even should a specific against one of the germs be found, nature would be left unaided to cope with the rest, so that the net result would be *nil*, or next to *nil*.

The one exception is when the infection is due to the pneumococcus and the tubercle bacillus, as when tuberculosis flares up after a case of pneumonia. Here nature seems to use the same neutralizing material for both toxins produced, and in these cases, usually considered so hopeless, chlorine has proved a valuable aid to recovery.

As for other cases of consumption, consumption here meaning far-advanced open tuberculosis, with broken-down immunity,

Halldorson has ceased to look for improvement from any mode of treatment.

But through mixed successes and failures he has year by year come to know the usefulness of chlorine as a therapeutic agent. It is as follows:

1. In all cases of pneumonia when the chlorides in the urine become scanty.

2. In tuberculosis, especially acute, "closed" cases, such as the typhoid form, and those of oncoming chronic trouble—the breaking down of immunity, whatever the cause. In far-advanced lung cases it will, as stated above, probably be found of little or no permanent value, but usually will do some good, if only by improving appetite. The same thing may be said of meningitis, especially when acute; also of chronic bone disease. Its chief value is during the early stage of tuberculosis infection, whether from an outside source or from the breaking down of an old focus, and before a new lesion is started in bones, lungs, meninges, or elsewhere.

3. In anemia and malnutrition in children when due to latent tuberculosis. As a rule, children respond to the action of this remedy better than adults.

4. In certain cases of summer diarrhea in children with high fever, great prostration, and restlessness.

5. In colds and la grippe. This he merely mentions, for he has had little experience with it. It is especially of value for those with latent tuberculosis, where a stitch in time will often save the whole garment.

It goes without saying that a statement like the one above should be made with the utmost caution. When, on the one hand, one is dealing with self-limited diseases like pneumonia, and, on the other hand, with tuberculosis, with its vagaries, long-continued course, and frequent surprises for better or for worse, the greatest care should be exercised in attributing therapeutic value to any remedy or any mode of treatment. This cannot be too strongly emphasized. But when the use of a certain drug is followed by improvement in the same disease with sufficient regularity to exclude chance and coincidence, it is only fair to

attribute the result to the drug; and, furthermore, when a good and sufficient physiological reason can be found to explain this effect, it would seem that the faith in the remedy is well founded.

Now, the physiological reason for the use of chlorine in pneumonia is the well-known fact that chlorides in the urine diminish in all cases of that disease, and that, if they disappear altogether, the patient invariably dies. The reason for this is that the pneumonia exudate is very rich in chlorides, so much so that it is even possible to tell that an extension has taken place in the lungs by a sudden diminution of chlorides in the urine. And on the other hand, when resolution begins, the urine chlorides correspondingly reappear.

The dose of chlorine solution is half a drachm to an ounce, and on account of its disagreeable physical characteristics it should be combined with some vehicle. Any of the tasteless extracts of cod-liver oil will answer the purpose, especially the one prepared by Parke, Davis & Company, with which it forms a very good mixture.

In pneumonia this may be given as follows:

R Sol. chlori,
Emuls. ol. morrh., aa ounce iv.

M. Sig.: Half an ounce every three or four hours, depending on the condition of the patient. If the case is very serious this may be given as often as every half-hour until relief is obtained. The dosage is the same for acute tuberculosis.

In chronic tuberculosis the same dose may be given before meals and at bedtime. Children under four years may be given a teaspoonful of the above mixture three to six times a day, according to what condition is to be met. To a child under one year twenty drops of chlorine solution in forty drops of extract of cod-liver oil may be given three times a day. An overdose will cause irritation of the stomach, which, however, is soon overcome by the use of sodium bicarbonate. The chlorine should then be stopped for the time being, but if necessary may be resumed within a few days in somewhat smaller doses.

Colorless chlorine water is useless.

Nothing but the greenish solution described in the U. S. P. should be made use of.

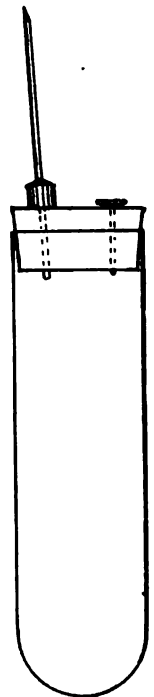
To be of material benefit a drug must be well understood by those who would make use of it. Chlorine is no exception to this rule. Let it never be forgotten that it is no cure for any disease. All it does is to produce a condition in certain diseases under which the curative forces may act to better advantage, by supplying a material of which nature's store is becoming exhausted. The saying that a physician is a hod-carrier to nature is therefore never more true than when it is employed.

[We hope the author is correct in his conclusions, but we fear that he is unduly enthusiastic.—Ed.]

A DEVICE FOR DRAWING SMALL AMOUNTS OF BLOOD.

BAYLES in the *Medical Record* of September 30, 1916, wishes to offer to those who have occasion to draw small quantities (6 to 30 Cc.) of blood (Wassermann) the description of a small, compact outfit, an improvement on that furnished by the New York Health Department. It is the usual experience, when the blood is drawn either by the physician unaided or with the assistance of patient or nurse, that more or less of it is spilled on the patient, doctor, or floor, after the needle enters the vein and before the receptacle is procured and placed in proper position.

As seen by the accompanying diagram, a rubber stopper is inserted in place of the ordinary cork. This stopper is fitted with a short, hollow needle, protected by a flange which is inserted through a small opening in the stopper and which acts as a vent. Another opening is made at the outer margin of the stopper, opposite the vent, for the insertion of the



needle furnished by the department, and thirty years ago with the use of methylene blue, a sulphurated compound, in malaria. Mr. John Ward holds that a parasitotropic substance must be organotropic as well. Arsenic, which in certain combinations is the most powerful parasiticide, is also highly organotropic, hence toxic. Iron is neither parasitotropic nor organotropic, while sulphur, non-parasitotropic, is organotropic in that it is a stimulant to organic cells and tissues.

The technique is simple: Remove the cork from tube, insert rubber stopper, push needle through the rubber stopper as indicated by mark on stopper as shown in diagram. We thus have a needle fitted into a tube, the latter serving as a handle, and the outfit is used in much the same manner as one would use an awl. After the desired quantity of blood is withdrawn the rubber stopper is removed and the original cork inserted. The outfit is then ready to return to the laboratory for examination.

The rubber stopper should be washed under a faucet, sterilized, and placed in alcohol, ready for future use.

THE RATIONALE AND PRACTICE OF CHEMOTHERAPY.

The *Medical Record* of October 21, 1916, in an editorial states that our notions of chemotherapy are at present in an unsettled state, for we do not know how many forms of therapeutic activity are to be comprised under this term, nor, so far as we have gone, are we sure in practice even of the parasitotropic action of arsenic in infectious diseases, and chiefly of salvarsan in syphilis. J. E. R. McDonagh believes that salvarsan is not truly parasitotropic, because it attacks only a certain formation contained in the spirochete by reason of an oxidizing action. Salvarsan is on the other hand organotropic and toxic and attacks especially some of the intracranial tissues. Much of McDonagh's reasoning is directed against Ehrlich's side-chain theory, which takes for granted that chemotherapy is parasitotropic therapy. On the other hand McDonagh may be correct in his belief that chemotherapy is a matter of oxidations and reductions. He has used non-toxic oxidizing compounds of sulphur of iron in an attempt to replace arsenic, but evidence of cure of obstinate syphilitic lesions by such drugs is not yet regarded as entirely conclusive. Dr. C. H. Browning has claimed that chemotherapy really began

blue, a sulphurated compound, in malaria. Mr. John Ward holds that a parasitotropic substance must be organotropic as well. Arsenic, which in certain combinations is the most powerful parasiticide, is also highly organotropic, hence toxic. Iron is neither parasitotropic nor organotropic, while sulphur, non-parasitotropic, is organotropic in that it is a stimulant to organic cells and tissues.

McDonagh first passed from toxic arsenic to its congener phosphorus, but finding this likewise too toxic, made experiments with a third metalloid, sulphur, which he incorporated into certain synthetics closely resembling in composition salvarsan. Intramine, one of these, has been used somewhat since the war began as a substitute for salvarsan, but is admittedly inferior to the latter save, it is alleged, in recurrences. McDonagh insists, however, that with it should be associated for best results a reducing principle, namely, colloidal iodine, to be introduced into a vein or muscle. McDonagh has also prepared a synthetic of the salvarsan type in which iron enters. He insists especially on the value of intramine in intracranial syphilis, which is often made worse by salvarsan; also in so-called neurorecidives, which salvarsan has been accused of causing.

PELVIC MASSAGE.

Writing in the *New York Medical Journal* of September 30, 1916, HERB asserts that the very fact that pelvic massage has won a permanent place in the treatment of diseases of women and is successfully practiced by many physicians is sufficient proof that the method itself is not at fault. Massage is, indeed, recognized and acknowledged as one of our best palliative or curative measures for the very same afflictions for which it is recommended in women, if such afflictions are at the surface of the body or where they are easily accessible. Here as well as there it is used to remove remnants of inflammatory conditions, to improve local circulation, or to free nerves, blood-vessels, or organs

embedded in or distorted and displaced by cicatricial tissues, and has proved equally satisfactory in both instances.

If the method is not at fault we must, of necessity, look to the physician for the cause of failure. With him, in fact, the trouble lies. It is due to the special requirements demanded of the operator. General massage requires comparatively little medical knowledge and skill and no special fitness, save physical strength and endurance. Pel-

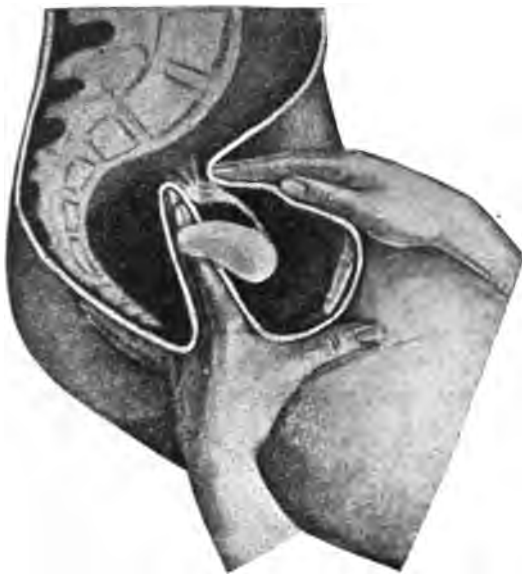


FIG. 1.—The fingers of the physician are sufficiently long to reach behind the ovary. In pressing the outer and inner fingers together, the ovary slips forward and the adhesions become accessible. They can now be stretched or broken, as the case may be, and the patient relieved.

vic massage, on the contrary, requires a high degree of knowledge and skill, but, above all, fingers sufficiently long to render the pelvic organs readily accessible to the masseur. It is this last-mentioned requirement which has not received the attention it deserves as an absolute prerequisite to success in pelvic massage.

Nothing is more obvious than that success in this important branch of the medical healing art must depend, first of all, on the ability of the physician to get freely to the organs from all sides. If he cannot thoroughly reach them, he certainly cannot successfully treat them. Let us assume that the doctor masters his anatomy, that he has sufficient experience and skill in examining women to enable him to outline clearly and

definitely the pelvic organs and to make a good diagnosis, that he knows his pathology and the indications and contraindications of pelvic massage, and that he is fully competent to select the proper cases and to reject those not suitable for this kind of treatment. Such a doctor has all the qualifications to be or to become an excellent gynecologist, or gynecological surgeon, but he will not be successful in pelvic massage if the length of his fingers falls below a certain measure. For a better understanding Herb refers to figures 1 and 2.

There are many other conditions besides that illustrated with which short fingers are not able to cope. Every sixteenth of an inch more or less means just so much more or less toward success or failure in treating women by massage.

The varying length of the fingers of the different physicians will alone explain much of the perplexing difference of opinion ap-



FIG. 2.—The fingers of the physician are not long enough to reach behind the ovary, though he may feel it and ascertain its site, size, contour, tenderness, and all other normal or abnormal conditions. In pressing the outer and inner fingers together the ovary slips backward and the adhesions become inaccessible. They cannot now be treated by massage, and the patient cannot be relieved, in spite of the fact that the physician may make a good diagnosis and knows well what should be done.

parent in the literature on pelvic massage. Other things being equal, the physician with long fingers will work easily, quickly, and without causing much pain. He is the one who succeeds and recommends massage. The physician with short fingers, however,

will work under stress and difficulties and cause much pain. He is the one who fails, loses his patients, and decries massage. An investigation of the comparative length of the fingers of those for and against massage will, Herb is convinced, fully bear out this statement. His personal observations have been most convincing. Of course, radical surgeons, who have never tried massage, and who give consideration to nothing but surgical methods in the treatment of women, are not included in this estimate.

To provide for some more definite figures as to the length of fingers necessary for pelvic massage, Herb may state that the available length of his own middle finger is three and fifteen-sixteenths inches. This is decidedly more than the average length, as confirmed by his personal observation. In spite of this decided advantage he has occasionally realized that still longer fingers would give him quicker and better results. Dr. Robert Ziegenspeck, of Munich, Germany, one of Europe's most ardent and successful advocates of pelvic massage, has fingers slightly longer than Herb's. He studied under Thure Brandt personally and had ample opportunity to observe the length of the fingers of his master. While Herb was assistant at this clinic he heard Ziegenspeck remark a number of times that his—that is, Ziegenspeck's—fingers were midgets compared to those of Thure Brandt. Many times since Herb wondered how much of Thure Brandt's extraordinary success was due to the extraordinary length of his fingers and how much to his undoubted genius.

These disclosures are of no small moment from a practical standpoint. There is a large percentage of gynecological cases that can be successfully treated in no other way than by massage. Herb refers here to women with postoperative pelvic adhesions, if a secondary operation is out of the question, and to those far more numerous women who are afflicted with chronic shrinking processes within the ligaments and their many distressing symptoms. Then there is a still larger percentage of cases for which pelvic massage constitutes not the

only yet the best and most successful treatment. If we would do justice to these cases, we must train physicians in pelvic massage in postgraduate schools. But pelvic massage is not easy. To avoid disappointment to physician and public alike, it remains essential to select from the applicants for tuition only those who have the proper physical as well as scientific qualifications, as has been explained.

HAY-FEVER AND ITS TREATMENT.

In the *Medical Review of Reviews* for October, 1916, NEWCOMB says that as to medicinal treatment in hay-fever it may seem absurd to say that there is a radical form of treatment. Of course, when paroxysmal sneezing is brought about by pathological conditions, or when such conditions aggravate or are apt to induce attacks of the disease, the necessary operative procedures for relief are always in place. Watson Williams thinks there is no doubt that paroxysmal bronchial asthma may be set up by nasal affections and may be cured by the removal of the nasal diseases. But cases of this nature are rare. So far as radical treatment is concerned, Stein says that arguing on the assumption that we are dealing with a disorder in which the nerve tissue has been made hypersensitive to certain external exciting agents by a perverted internal disturbance, and that the fifth nerve in particular, on account of its colossal peripheral distribution, is unduly exposed to this external agent, the idea of interrupting service between this nerve and the sympathetic system presents itself as a most rational mode of procedure. Stein first effected this in 1907 by blocking the nerve with alcohol, and since that time has had good results by this method.

As a nose and throat specialist of considerable experience Newcomb wants to say that methods of treating hay-fever from the standpoint of his specialty have not been attended with very great success. As said before, when pathological conditions are present these should be treated by operation if necessary. Local treatment is

usually no more than palliative, although he has had a fair measure of success with adrenalin.

He takes it that hay-fever is mostly a neurosis—that is, that persons predisposed to it are of neurotic temperament. Treatment therefore should consist in all measures calculated to correct disturbed metabolism and in toning the nervous system. It is found by many that going away before the season for an attack usually accomplishes the desired object. Sea air is beneficial, and in any event a change of air is indicated; a change of scene, too, where the mischievous seeds and grasses which cause the complaint are absent. When the patient has to remain at home efforts should be put forth to protect the subject from the external irritating causes. Nevertheless, he must confess that judging from his experience the chief hope of eradicating hay-fever lies in preventive measures.

THE POSSIBILITY OF NOVOCAINE ADDICTION.

The *Boston Medical and Surgical Journal* of October 5, 1916, discusses this matter editorially as follows:

Whether or not the Harrison law will ultimately prove effectual in abolishing, or at least minimizing, the evils of addiction to drugs is dubious as yet. The intent of the law is good, but recent judicial decisions and interpretations have warned us that there are vulnerable places in it. Leaving out of the discussion for the moment opium and its derivatives, we have to consider cocaine, which would present an easier problem. In the first place there is not in the case of cocaine an addiction in the special sense we mean when we speak of morphine addiction. The devotees of the former drug get in the habit of taking the drug at intervals, these being regulated, in the lower class of users, by fluctuations of their personal finances, and in the higher class by circumstances of expediency. Following a cocaine debauch there is a true depression, but not the physiological craving for the drug which the opium habitué

experiences. In the second place, cocaine has a more limited field in medicine than opium does, and it is not impossible that it may be replaced as a local anesthetic by other drugs, which do not possess among their properties the production of emotional exaltation.

Among the drugs which naturally occur to us in this connection is novocaine. This powerful anesthetic, like others of its class, ends in "caine," to indicate its physiological action as a local anesthetic, but is not chemically related to cocaine, being the hydrochloride of the organic base para-amino-benzoyl-diethylamino-ethane, a derivative of para-amino-benzoic acid, while cocaine is benzoyl methyl-ecgonine. It does not appear, from what scant information is available, that novocaine produces the psychic effects which cocaine does; however, a great deal more data must be obtained before any conclusion can be drawn as to this. If true it would seem that the substitution of novocaine for cocaine, wherever at all possible, would be indicated, so that the latter drug could be withdrawn from the market entirely. Before this is done the proper procedure would be to test out novocaine on a group of individuals of varying temperament, to see whether or not it ever produces emotional reactions of a pleasurable nature.

[There are, however, certain advantageous effects of cocaine not possessed by novocaine.—Ed.]

ON THE VALUE OF ROENTGEN RAY EXAMINATION IN THE DIAGNOSIS OF CANCER OF THE STOMACH.

BAETJER and FRIEDENWALD (*Bulletin of the Johns Hopkins Hospital*, August, 1916) believe from their studies of many cases of cancer of the stomach that they are justified in drawing the following conclusions:

The Roentgen ray offers most valuable assistance as an aid in the diagnosis of gastric carcinoma; and this is especially true when the lesion is situated in the so-called silent area. It should not be relied upon alone in the diagnosis of early cases

without a strict consideration of the clinical aspect of the disease, but when taken in conjunction with the other signs it is of the greatest diagnostic value.

Indurated gastric ulcers give roentgenograms similar to those of carcinoma; but inasmuch as ulcers are frequently precursors of cancer, they may be grouped for practical purposes in the same class. It is often possible to determine their true nature only by microscopic examination of the excised area.

In the diagnosis of carcinoma of the stomach two conditions must be taken into consideration: first, the peristaltic waves of the stomach; and second, the morphological defect in the stomach.

In carcinoma of the cardiac area of the stomach there is usually a filling defect present, the activity of the stomach itself being normal, and, unless the lesion be very extensive, there is no interruption in the peristaltic waves. In lesions of the body of the stomach the peristaltic waves are interrupted in their course at the seat of the lesion, because the lesion itself is hard and indurated, and does not admit of further peristaltic movements. There is also present a persistent filling defect. In pyloric carcinoma there are usually signs of early obstruction in addition to a filling defect of small or large size, according to the extent of the growth.

In carcinoma, unless there be obstruction, there is always hypermotility with rapid evacuation of contents. In ulcer there is hypermotility with pylorospasm, and more or less retention of contents. In carcinoma the filling defect is generally surrounded by an invasive area, interfering with the motility, and producing a large dead area, whereas in ulcer the filling defect is much smaller, and is not so apt to interfere with the immediate peristaltic waves. The Roentgen ray furnishes us with important evidence regarding the operability or non-operability of the growth, pointing out, as it does, the location and extent of the growth, together with the degree of obstruction and the amount of involvement.

Negative findings are at times quite as important as positive ones, inasmuch as absence of the various *x*-ray signs of cancer affords presumptive evidence of the absence of this affection.

EPIPLOITIS FOLLOWING HERNIOTOMY.

HESSERT (*Surgery, Gynecology and Obstetrics*, September, 1916) notes that in the very acute cases the symptoms arise in a few days after operation, and consist of the usual signs of an acute infection within the abdomen, ending with general suppurative peritonitis. In rare instances the process may become localized with abscess formation.

By far the majority of the cases run a subacute or chronic course lasting for months or even years. The free interval after operation is generally of four to eight weeks' duration, but cases are on record in which two to three years elapsed before the onset of symptoms.

Pain is one of the first and most constant symptoms. It may at first be in any portion of the abdomen, depending on the location of the inflammation. Frequently it is in the upper abdomen, and is aggravated by deep breathing, coughing, or tight clothing. Associated with the pain there is usually a rise of temperature, with all its attending symptoms. There may be an absence of signs pointing to any special organ, and in some cases the symptoms all subside, and the patient gradually makes a spontaneous recovery. More often the disease is progressive, with finally all the signs of a localized abscess in the abdomen manifest. The pus in such cases may rupture into the bowel, or succeed in burrowing through the abdominal wall.

In the type of cases that develop slowly and insidiously, with vague and ill-defined symptoms, there is great resemblance to the clinical course of a cancer. The presence of a palpable mass is further suggestive of malignancy. In doubtful cases the abdomen has been opened, and even then the oper-

ator is in doubt whether the tumor is a carcinoma, sarcoma, or of inflammatory origin.

In every case of a herniotomy where abdominal symptoms supervene, the possibility of epiploitis must be considered. It is very likely that there have been many cases which have not been recognized or have been incorrectly interpreted, because epiploitis in this connection has received but little attention. Diagnosis is suggested by the occurrence of pain associated with the development of a mass in the abdomen. The tumor is usually on the same side as the herniotomy, on a level with or above the umbilicus. The tumor has been but rarely seen in the pelvis or inguinal region. It varies in size, but has been known to grow very large. It is tender on palpation, and is usually fixed to the abdominal wall, so that it does not move with respiration. There is usually dulness or flatness on percussion, as the intestines are beneath the mass.

In differential diagnosis one must consider cholecystitis, subacute appendicitis, chronic perforation of the stomach, foreign body (such as a gauze sponge) diverticulitis of the sigmoid, and pancreatitis.

According to Braun the development of an inflammatory tumor of the omentum after herniotomy does not necessarily demand operation, for a fair proportion of such cases recover under expectant treatment. It is fair to assume, however, that the diagnosis in some of the recovered cases might be open to some question.

The most radical view relative to treatment was expressed by Reynier, one of the early writers, who advised extirpation of the tumor as though it were malignant.

The practical lesson to be learned is that we should be familiar with epiploitis, as it may complicate recovery after a herniotomy, and adopt the measures necessary for prevention. These are in fact elementary, and include first a faultless operative technique, both aseptic and mechanical. There should, above all, be an avoidance of rough handling of tissues. Portions of the omen-

tum should not be removed at all during the performance of a hernia operation unless there is a valid indication. If resection must be made, then absorbable suture material of as small a size as possible should be employed. The vessels in the omentum should be tied with many fine ligatures, and the use of *en masse* or figure-of-eight ligatures should not be considered. Section should always be made through healthy omental tissue, never allowing any diseased tissue to slip back into the abdominal cavity.

After the diagnosis of epiploitis has been made, the decision for operative interference rests with the judgment of the surgeon. The acuteness of the symptoms and the progress of the disease would be determining factors. Under ordinary conditions no harm can follow an exploratory incision. It is best to remove the inflammatory mass completely if possible. If owing to adhesions and abscess formation removal is impossible, then there should be thorough drainage.

In the event of intestinal obstruction caused by an old fibrous inflammatory mass, it may be necessary to resect or short-circuit the bowel.

THE TRANSPLANTATION OF THE ARTICULAR END OF BONE, INCLUDING THE EPIPHYSEAL CARTILAGE LINE.

HAAS (*Surgery, Gynecology and Obstetrics*, September, 1916) as the result of a carefully conducted and well reported series of laboratory studies finds that the epiphyseal cartilage line ceases to functionate after reimplantation and autotransplantation, either when transplanted by itself or with a small or a large piece of adjoining diaphyseal or epiphyseal bone, or even when transplanted as an entire intact bone. The longitudinal growth ceases in every case. The only evidence of regeneration is near the periphery beneath the perichondrium, which part seems to retain its property of producing cartilage. This new cartilage

possesses none of the length-producing functions of the normal epiphyseal cartilage line. The epiphyseal cartilage line is the least transplantable of any of the components of bone.

The articular cartilage undergoes practically no changes after reimplantation. In autotransplantation there occurs at times evidence of degenerative and regenerative changes. In some of the experiments of longer duration there is a partial substitution by fibrous tissue. The articular cartilage offers the greatest possibilities of successful transplantation of the various parts of a bone.

The vitality of the various components of bone after transplantation is directly related to the ability of that part to withstand the loss of its vascular supply. The less dependent the part is upon its blood supply the greater is the possibility of a successful transplantation, as in the articular cartilage; while, on the other hand, the more dependent the part is upon its vascular connections the less likely is the possibility of a successful transplantation, as in the epiphyseal cartilage line.

From these experiments and the results in general on transplanted bone the following conclusion is offered regarding the fate of bone after transplantation: Although each part of transplanted bone possesses the power to regenerate independently and without the aid of neighboring bone, this autonomous newly formed tissue does not possess that property which is necessary for a continued existence, and it will ultimately entirely disappear. Some additional stimulus is needed, and such conditions are only obtained when the transplant is in direct contact with normal growing bone. Therefore, when there is failure of such connection the transplanted bone at first shows evidence of regeneration, but if a sufficient time is allowed to elapse it will ultimately entirely disappear. However, if it is united with the cut surface of normal bone it will continue to live because certain necessary additional stimuli and new elements will be supplied by the host.

DISABILITIES OF THE KNEE-JOINT.

JONES (*British Medical Journal*, Aug. 5, 1916) gives a broad classification of these disabilities and derangements and the diagnostic signs, and indicates the appropriate lines of treatment.

There are three common conditions which are not always as clearly distinguished by practitioners as they might be. They are: (1) simple sprain of the lateral ligament, usually the internal; (2) slipping of the semilunar cartilage; and (3) nipping of the infrapatellar pad of fat. All these injuries may be produced by a twist or fall, which at first does not seem serious; all are associated with effusion of fluid in the joint; and in all the patient complains of more or less recurring disability after the lesion, unless it has been recognized and treated in the first instance.

Sprain of the internal lateral ligament is distinguished by definite pain and tenderness on pressure over the attachments of the internal lateral ligament; the patient himself localizes the pain of which he complains to the inner side of the knee; definite pain and tenderness are not found anywhere else about the knee, and the movement of eversion and external rotation of the leg stretches the injured ligament and retards recovery.

The treatment indicated, therefore, is firm strapping round the knee in order to steady it, and a raising of the inner side of the heel to divert body weight to the outer side of the foot, and thus relieve the ligament from tension. It is hardly necessary to say this treatment is preceded by rest in bed, usually with the aid of a straight posterior splint. This is the initial treatment, but neglect of the after-treatment just mentioned renders the patient liable to recurring injuries of the ligament.

If we remember the anatomical fact that the internal semilunar cartilage is closely connected round its convex margin with the deepest layers of the internal ligament and with the capsule of the knee-joint, we will understand why a severe twist of the knee, with the leg abducted, may rupture the liga-

ment and drag the semilunar cartilage with it, straining or tearing the attachments of the anterior horn. At this stage the inner side of the knee-joint is, so to speak, opened out, and everything depends upon what happens when it closes again as soon as the distorting force ceases to act.

If the cartilage is caught in displacement between the bones the knee "locks" in the manner familiar to us all. The cartilage may be split, fractured transversely, rolled up, or completely torn from its attachments. Sometimes the cartilage slips back into position without being crushed or caught between the bones; there is then no locking of the joint, but in every respect the etiology of the lesion is the same with the exception of the actual injury to the cartilage, and the patient generally states that he felt something "slip" or "click" in the knee, but could quite easily straighten it immediately after the accident.

The physical signs are tenderness on pressure over the internal lateral ligamentum patellæ just over the border of the tibia, a symptom always strongly suggestive of an injury about the attachment of the anterior end of the internal semilunar cartilage.

If the knee can be fully extended without causing pain, the aim should be to insure complete rest until the torn attachments have united. The knee should be kept absolutely straight on a back splint for at least ten days, the bandage being firmly applied over cotton-wool. After this the patient may begin to walk, and when he does so he should have a firm bandage over the knee to prevent effusion into it. Movements of the joint should be very limited the first day, and should gradually increase in range.

If the knee is carefully brought into use by graduated exercise, there should never be much effusion, and each day it should be less in amount; that is to say, there is no effusion in the morning, although by the end of the day it may have appeared, and each evening the amount is less than on the preceding one.

When these cases have been the victims of defective after-treatment, repeated stretching and effusion about the anterior end of the semilunar cartilage gives rise to a thickened cicatrix, which is tender, and can sometimes even be felt by the surgeon moving under his finger as the knee is flexed and extended. This painful spot is situated at the diagnostic point, already described, on the front of the knee, well to the inner side of the ligamentum patellæ. Sometimes this cicatricial thickening is so great that it is pinched between the bones when the knee is fully extended, and this causes sharp, well-localized pain and tenderness.

Treatment in such cases depends upon the exact condition, and two types must be distinguished:

1. In cases in which the cicatrix is not pinched, but merely gives rise to a sense of insecurity as if something is moving or "clicking" inside the joint, a rigorous course of strict rest, followed by massage and carefully graduated exercises, may cure the condition in a month.

2. In cases in which the cicatricial mass gets definitely nipped, the condition has become similar to the type of displaced semilunar cartilage usually described, and if rest and careful exercise fail an operation to remove the whole mass is indicated—the opportunity being taken to inspect the cartilage at the same time.

It has long been recognized that definite "locking" of the knee-joint is a characteristic sign of displacement of the internal semilunar cartilage, as described in text-books. This condition is a more severe variety of the injury just described; it differs from it in the fact that some portion of the cartilage is, for a time at least, caught between the bones and prevents full extension.

The treatment of this condition aims at the restoration of the power of extending the knee fully without pain.

If the displaced cartilage is fully reduced the knee can be fully extended, both actively and passively, without pain. If this cannot be done, the cartilage is not reduced. When the cartilage becomes disengaged the patient

is aware of it—in fact, he is the most competent judge of the success or failure of the manipulation.

First complete reduction is necessary. The patient should lie on his back with the thigh flexed on the body and the leg on the thigh. When in this position the surgeon can manipulate the leg, and can sometimes feel a fulness over the site of the displaced cartilage.

The patient is then told that he will be given the word "One, two, three; kick!" On the word "kick" the patient extends the limb as suddenly as he can. At the same time the surgeon rotates the foot inward and pulls, while pressure is placed upon the thigh. If the dislocated cartilage is reduced, the patient is almost certain to announce the fact, and the objective sign is that the knee can be completely extended without impediment. The knee, surrounded by wool, should be bandaged firmly, and fixed on a posterior knee splint. If the patient is not of a temperament likely to be helpful, an anesthetic is advisable. The patient should wear the splint for about ten days, but can usually be allowed up in his room at the end of five days. After ten days he may walk with the knee bandaged, taking care not to bend the knee suddenly. Active flexion of the joint should be practiced very gradually, and the quadriceps muscle should be massaged and exercised gently. If the progression is carefully made from gentle to stronger movements, the full range should be recovered without the recurrence of any effusion in the joint in about three weeks. The majority of these cases, carefully and efficiently treated in the first instance, do not give any further trouble.

Where a successful reduction is not accomplished, and in consequence the patient is not able to extend the knee fully, an operation will probably be required.

A word of warning may here be given about cases in which reduction is apparently complete, and the patient can get about with tolerable comfort, but complains that the knee-joint does not feel quite secure, although there is no evidence of the intru-

sion of any structure between the bones. These symptoms are often due to some minute adhesion within the joint which does not produce sufficient limitation of movement to be detected by the surgeon, but leaves the patient with the sense that he cannot use the joint without a feeling of restraint. Full movement of the joint, particularly in rotation, under gas anesthesia, will often remove these symptoms, although the surgeon cannot always feel any definite adhesion give way during the manipulation.

Operations on cartilages, even at base hospitals at the front, should be discouraged. It is not a practice which can be recommended, as the environment is a source of danger, no matter how experienced the surgeon.

The leg is placed to hang over the end of a table at right angles to the thigh; the knee is wrapped in sterile gauze, soaked in biniodide solution; the incision is made through the gauze, and the edges of the gauze clipped over the skin edges to the superficial fascia. As the knife with which the skin is cut may become infected by staphylococcus albus, a second clean knife should be used for all the deeper dissections. The incision need not be more than an inch or an inch and a half in length; it is made over the anterior end of the cartilage, sloping very slightly downward and inward—that is, nearly but not quite parallel to the upper edge of the tibia. Great care should be taken never to allow the incision to extend far enough to the inner side to cut any fibers of the internal lateral ligament; this is a fault which leads to weakness of the knee lasting for months or years, and is, unfortunately, still frequently to be met with in cases which have been operated on by the old large J-shaped incision described in text-books. The joint being opened, a blunt hook can be slipped under the free margin of the cartilage, and by picking it up it can easily be seen whether the front part is intact or torn, or has tags or projections, producing disability. In removing the whole cartilage great care should be taken

that no tags of cartilage are left projecting from the attachment to the conorary ligament, as these frequently give rise to continued symptoms, due to nipping or adhesions, and may necessitate a second operation. It is not until the stitching is complete and pads placed over the wound that the knee is straightened. Dressings are then applied, elastic pressure put on by bandaging over large pads of wool, and a simple posterior knee splint affixed to keep the knee straight. If the operation is performed with a tourniquet around the thigh—and this is advisable—no vessels need be tied; and if the elastic pressure is applied before the tourniquet is removed there need be no fear of bleeding into the joint.

Cases are met with in which the patient suffers from abnormal mobility of the knee-joint, clearly indicating that one or both of the crucial ligaments have been ruptured or stretched. Bearing in mind the mechanism of the crucial ligaments, it is not difficult to make a diagnosis.

The anterior crucial ligament is tense when the knee is fully extended, and prevents the tibia from being displaced forward on the femur.

The posterior crucial ligament is tense in complete flexion, and prevents the tibia from being displaced backward on the femur.

Both ligaments check inward rotation of the tibia. Hence, if the tibia cannot be displaced forward in the extended position, it may be assumed that the anterior crucial ligament is not completely torn; and if the tibia cannot be displaced backward in full flexion, the posterior crucial ligament is presumably not ruptured. Abnormal mobility indicates elongation or rupture of the corresponding ligament. The history of an injury helps the surgeon to exclude cases in which prolonged distention of the joint with fluid has caused elongation of all the ligaments, as well as the conditions associated with diseases such as Charcot's disease or locomotor ataxia. The treatment, when any such condition is diagnosed, is prolonged

rest with the knee in extension, or fixed in plaster, or a Thomas caliper splint, in which the patient can walk, the object being to keep the joint immobilized for a time long enough to allow union of the torn ligaments or adaptive shortening of stretched tissue. The operation of stitching the ligaments is absolutely futile as a mechanical procedure. Natural cicatricial tissue, allowed to mature without being stretched, is the only reliable means of repair.

Almost any injury of the knee which is associated with increased vascularity or bruising may give rise to swelling of the pad of fat situated behind the patellar ligament. Consequently this fat is liable to be nipped in full extension of the knee. In ordinary civil life this forms one of the varieties of the initial stage of a local mon-articular rheumatoid arthritis. The condition, however, is in no sense rheumatic. The patient complains of pain and tenderness in the knee after walking, and especially when going up and down stairs, or when getting up suddenly from a chair after sitting for any length of time. The condition is maintained by the repeated small injuries which occur every time the knee is fully extended. The treatment, therefore, is obviously to prevent the patient from inflicting small bruises on the tender fat and its covering of synovial membrane. This can easily be done by putting a cork pad, half an inch thick, inside the boot under the heel, to prevent the complete extension of the knee during walking, and by fitting the knee with a cage support, which allows full flexion but limits extension by about 80 degrees. Wearing this boot and cage splint the patient cannot fully extend the joint, and in this way bruise the post-patellar fat. The swelling gradually disappears, and after a few weeks full extension can be performed without pain. The diagnosis of this condition is easy. The patient complains of pain in the knee or, more often, in the front of the knee, not at the inner side. Passive extension of the knee by the surgeon produces the pain, which is definitely localized just below and behind the patella.

On palpation the thickening of the pad of fat may be felt; it is enlarged and tender, but there is no sensitiveness over the internal cartilage or the internal lateral ligament. In some instances the retropatellar pad of fat may be bruised in common with injury to the semilunar cartilage. The tender point of the internal lateral ligament, the cartilage, and fatty pad will be found in such a case.

In all the injuries of the knee which Jones has been discussing wasting and weakening of the quadriceps muscle is a characteristic feature, and no treatment can be regarded as sufficient which does not provide for the restoration of the efficiency of this muscle during the stage of convalescence. This is particularly to be noted in the condition which is now under discussion, for some of the deep short fibers of the subcrureus muscle are inserted into the synovial membrane and help to pull the pad of fat out of danger when the knee is extended. Neglect, therefore, of the quadriceps muscle will leave the patient peculiarly liable to a recurrence of the injury.

FECAL FISTULA.

CRILE (*Cleveland Medical Journal*, August, 1916) observes that most fortuitous or accidental fistulæ result from disease or from operations performed with inadequate facilities, such as appendectomy in an acute case, or salpingectomy. In acute appendicitis, for example, a fecal fistula may be caused by the surgeon or may result from the disease—but its occurrence may always be prevented. A not uncommon occurrence is the formation of a fistula by the sloughing away of a completely gangrenous cecum, or if the cecum is severely damaged the surgeon may complete its destruction. For this reason in cases of acute gangrenous appendicitis it is of prime importance to approach the perforated or gangrenous appendix with the utmost caution. The cecum should not be separated from its adhesions; the appendix should not be invaginated; and no drain or gauze should on any account be permitted to come

into contact with the cecum, whose integrity is threatened by infection. If a fistula appears during the acute stages of the infection, let it alone—do nothing, for nature will close it if given a chance. Infection may cause a fistula, but the surgeon will only perpetuate it by trying to remedy it while the infection is acute. By his would-be helpful efforts the surgeon may hinder the closure of the cecum until its mucous membrane grows out and meets the skin, for the insertion of a drainage tube as far as the fistulous opening produces an avenue for granulation along which the mucous membrane of the intestine grows rapidly until it reaches the skin—and a fecal fistula is the result. A fistula in any other part of the intestine may be produced in the same way.

However produced, immediately after its inception any fecal fistula may be healed in the simplest possible manner, viz., by placing neither gauze nor drainage tube in contact with the intestine. In his experience spontaneous closure has invariably followed this method of treatment. It is possible to thus dispose of drainage only if at the operation adhesions have not been broken up and only a simple opening made.

Cecal fistulæ may be cured with certainty by one of two methods of operation. Bismuth *x*-ray pictures disclose approximately the depth of the fistula or fistulæ, and show the branches if any exist. If the fistula be single and shallow, without branches, the operation may be performed after the method of Coffey. A probe is inserted for guidance. The tract and the wall of scarred and infected tissue is gradually isolated by a cautious dissection. The dissection is done within an ample incision which extends down toward the bowel at the border of the normal tissue of the original wound. The scar and the fistula are thus isolated together until the surface of the bowel is reached. The bowel is then most cautiously separated by sharp bloodless dissection up to the fistula, which is attached like an umbilicus to the cecum.

If the cecal wall be sufficiently thin and elastic the division of the fistula is similar

to an appendectomy—that is, the fistula is tied near the cecum with catgut, is divided, and the stump is invaginated. If omentum is at hand, as it usually is, it is patched over all.

These operations for single unbranched fistulæ are the easiest. A more complicated operation is required where there are branching sinuses; when the fistula, though single, is long and tortuous; and when the opening is so large as to receive a large portion of the bowel contents. In these cases the fistula is firmly covered by a pad of gauze held down by adhesive plaster. The fistulous territory is separated from the proposed abdominal incision by a towel which is sutured to the skin. An ample abdominal incision is made internal to the fistula and the adherent intestinal coils are separated by sharp dissection until the site of the fistula is located. A lateral intestinal anastomosis is made at a safe distance from the fistula, and if conditions are favorable the distal coils are plicated to prevent further fecal discharge. The wound is closed in the usual way, the piece of gauze and adhesive plaster over the fistulous opening being left in place as long as possible. By this means primary union is usually secured. The isolated coil of intestine containing the fistula shrinks from disuse and usually the fistula closes spontaneously; if not, its closure may be effected by the deep destruction of the mucous membrane.

Some sigmoid fistulæ are so deep in the pelvis and have such large lamina and such thick walls that neither invagination nor direct suture can succeed. In such cases, if the isolation of the fistula by anastomosis was impossible, the writer divided the bowel, completely resected the fistula, and then either (a) made an end-to-end suture by means of the efficient cobbler stitch, or (b) closed the ends by invagination and made a side-to-side anastomosis. In the latter case he stitched the invaginated end to the adjacent bowel to prevent obstruction of the stoma by further invagination. Omental wrapping is employed whenever possible. A cigarette drain is placed carefully away from the field of operation. In

an extremely difficult case of sigmoid fistula a temporary fistula of the cecum was made.

In a recent case of a rectal fistula of many years' standing discharging just above the pubes, in which at exploration the pelvis proved to be an impenetrable mass, he made a long incision down to the depth of the fistula. The incision was left wide open and treated with exposure to electric light and hypochlorous acid; later when sterile the edges were approximated with adhesive straps—apparently successfully.

Nitrous-oxide-oxygen anesthesia and anociassociation are employed in these operations and are of great advantage, as they eliminate shock, and minimize vomiting and impairment of immunity. If the hazard is great, glucose and sodium bicarbonate are given before and opium after the operation. Water is given freely, and sleep and rest secured by every possible means.

OS CALCIS FRACTURE.

COTTON (*Annals of Surgery*, October, 1916) points out that these lesions are not clean-cut breaks, but are of a crushing, spreading character. The whole bone is mashed down. The patient lands on his heel and crushes the bone. The bone is decreased in vertical depth and increased in lateral diameter, which is much more important, due to bulging outward under the external malleolus. The outer plate of the bone is more compact than the rest and carries with it the peroneal tubercle and the peroneal tendon sheath. This is such a constant feature that Cotton always expects it and has always, save in two cases, found unmistakable bony thickening at this point, and this in itself is diagnostic. It has one other nearly constant factor, the interference of the joint between the astragalus and calcis, particularly with the posterior calcaneoastragaloid joint. It may be directly involved or may simply have its range of sliding motion shortened, or its alignment thrown out by the displacement of fragments, without the joint being broken open. Either of these injuries causes it to go out

of commission as an effective mechanism. This is important, since it is almost purely between astragalus and calcis that the movements we call pronation and supination occur.

In these fractures, therefore, we nearly always find lateral motion gone, and up-and-down motion preserved. The nearly constant features are pushing up of the heel, broadening of the bone, mainly outward, and interference with the lateral mobility. Of about 14 cases recently referred to Cotton, none was fit to work when seen, and but three looked promising.

Henderson collected for Cotton cases treated at the State Hospital for the last four years. There were seven treated only by manipulation and plaster or not at all. They all limped and had painful feet. There were 12 cases treated, with very much better results. Study of 144 cases with real data on 55 shows that results without more treatment than the traditional plaster are appallingly bad.

With some pains taken (some attempt at reduction) the results are better; sometimes even excellent. The method of treatment advocated by Cotton is as follows:

Loosen up the fracture by manipulation.

Pull the heel down. Cotton used to put a sound through from side to in front of the heel-cord, and pull down; latterly he has used ice-tongs as easier to handle and affording a better grip.

Free the joint motion between astragalus and calcis.

Push in the displaced bone under the external malleolus; this narrows and shapes the whole bone. It is done by slowly striking with a big mallet on the outer side of the foot, padding with felt to take the blow, and supporting the inner side of the foot on a sand-bag. This impacts, and, owing to the fact that the outer plate is firm, the impaction is usually fairly solid.

The foot is put up in plaster, not at a right angle, but with the heel-cord slack; also avoid direct pressure on the heel.

It is well after the impaction to test again as to the presence of lateral motion. If the impaction has impaired it, work the

joints loose again and reimpact. This is rarely needed, however.

Cotton states he has done this impaction many times; he has never failed to get improved position, has usually succeeded in entirely abolishing the abnormal prominence below the external malleolus, and in restoring the lateral motion and in getting a serviceable impaction.

A SIMPLE APPARATUS FOR THE TREATMENT OF INCIPIENT HIP-JOINT DISEASE.

SPEER (*American Journal of Surgery*, September, 1916) states that in the incipient cases of joint disease the treatment resolves itself into two phases: first, extension; second, fixation. The apparatus by which he accomplishes this he thus describes:

It consists of two parts, one for night and the other for day use. That for night use is of the ordinary knee extension apparatus, for use in bed. It consists of a boot formed of plaster or any other material that can be fitted to the foot and leg, as far as the knee, ending in a ball, and split so that it may be taken off and put on as needed. To this is attached a cord, pulley, and a weight sufficient to relieve the child from pain and the usual night cries during the time it should be asleep.

For the day apparatus are required an ordinary well-fitting pair of shoes. On the bottom of the shoe for the foot of the well leg is built a cork extension of from one to three inches according to the size of the patient; on the shoe of the foot of the diseased leg the heel is removed, and there is substituted a heel of lead, as heavy as the patient can comfortably carry. Added to these is a pair of well-fitting crutches. In a night or two, if the weights are properly adjusted, the night apparatus will be found to give the patient perfect comfort and sleep. In the morning this apparatus is removed, the child is dressed as usual, and is turned out in the air to take exercise and to play with other children, except that he is expected to use his crutches and to keep the foot of the lame leg off the ground.

The objection will immediately be brought forward that while this apparatus performs extension, there is nothing between the foot and the support of the shoulders to keep the hip immobilized. However, one should remember that the line of extension is directly through the hip from the shoulder downward, and in order to steady the heavy weight the muscles of extension, abduction, and even circumflexion are exactly balanced. It will be seen that through the muscles being made to work in exact opposition we have an apparatus that immobilizes the hip even more securely than the so frequently used Thomas splint and its modification.

THE CLINICAL POSSIBILITIES OF THE PHARYNGEAL PITUITARY.

BRYANT (*Medical Record*, Sept. 9, 1916) writes this paper to show that the hypophysis system may be affected clinically through that portion of it lying in the nasopharynx, the pharyngeal pituitary, and that the results of clinical treatments of the pharyngeal pituitary are similar to those obtained, in like conditions, by hypophysis medication.

The pharyngeal pituitary is a part of the hypophysis system. It represents the lowermost extremity of Rathke's pouch, the hypophysial pedicle of the embryo, which, failing to emigrate through the cranium, has not disappeared through retrogression, but has become organized, in man, into a true glandular body in the pharynx. The phylogenetic history of the hypophysis system shows that in the lowest vertebrates the glandular lobe—itsself a portion of the primitive pharynx—is in open communication with the pharynx; this communication is usually lost in the ascending scale, by the chondrification of the base of the skull, but remnants of hypophysis tissue remain along the route traveled by the embryonic hypophysis from the ectodermic anlage to the brain. In mammals several hypophysis remnants or accessory hypophyses have been found in rabbits and cats (Arai) and in dogs. In man the accessory hypophyseal

tissue takes the form of the hypophysis of the pharynx. Consequently, in contrast to the cerebral hypophysis which lies inaccessible in the sella turcica, protected by the sphenoid bone, this accessory hypophysis tissue lies exposed at the pharyngeal angle, the most unprotected spot in the pharynx. It is located underlying Luschka's tonsil, and it may be found anywhere within the extreme boundaries—the mucous membrane in the middle line, the posterior margin of the vomer, and the base of the sphenoid.

The pharyngeal hypophysis is known to be present in the fetus and in individuals of all ages up to seventy-six years. In a fetus of 18 mm. it measured $1\frac{1}{2}$ mm. in length (Erdheim); in the adult its average length appears to be about 5 mm. The shortest length given in the literature is $1\frac{1}{2}$ mm. (fetus); the longest, 7 mm.; the least width, $\frac{1}{4}$ mm.; the greatest, 3 mm.; the least thickness, $\frac{1}{5}$ mm.; the greatest, $1\frac{1}{2}$ mm. These measurements are given here regardless of age. The size of the pharyngeal pituitary has been urged against the possibility of its functional importance. When, however, we consider the average dimensions of the cerebral pituitary (15 mm. in the transverse direction, 8 mm. in the anteroposterior, and 6 mm. in the vertical), in relation to its vital importance in the general economy, it is seen that the size of the accessory pituitary can be no argument against its activity.

According to Citelli, numerous capillaries and small veins are found both within and around the pharyngeal hypophysis; these vessels anastomose with the veins of the pharyngeal mucosa and the submucous tissue as well as with the veins of the periosteum of the lower sphenoid surface and the bone.

The function of the pharyngeal pituitary is probably auxiliary to that of the cerebral pituitary. Citelli has found indirect circulatory connections between the pharyngeal hypophysis and the cerebral hypophysis, through a venous plexus in the sphenoid body. There is also probably some nervous connection between them, and it is possible that there may be mutual secretory and stimulative activity between them. The

pharyngeal pituitary is the representative of the cerebral pituitary, located, like the lymphoid tissue, in the most vulnerable part of the body, because the exposure of this portion needed the strongest defense mechanism the body is capable of, which is the pituitary system.

The clinical relation of adenotomy to the hypophysis system is revealed in cases of "adenoids"; adenotomy, an operation which impinges upon the periphery of the hypophysis system, relieves the pharyngeal pituitary, together with the lymphoid tissue, as is shown by the reaction of the hypophysis system in form of more rapid growth and improved nutrition after this operation. (It seems hardly necessary to state that the pituitary system is known to be of essential importance for the normal course of the processes of growth.) Furthermore, adenotomy relieves a psychic symptom-complex pathognomonic for hypophysial lesions, which is associated with "adenoids" and affections of the nasal passages; this complex comprises loss of memory, partial or complete; aprosexia, mental and emotional sluggishness, and morbid drowsiness and somnolence. The frequent remarkable psychic change after adenotomy is a matter of common knowledge. It is interesting that Citelli states that this symptom-complex can be removed through operative or local treatment of the primary disease, alone; or it can also be removed through general hypophysial treatment without local measures; a certain and permanent recovery is insured through the combination of these two methods of treatment.

For nearly thirty years the author has been using this stimulation empirically in hypertrophic conditions of the lymphoid tissue and the mucous membrane of the rhinopharynx with hypertrophic ear conditions, instead of adenotomy; in conditions of the mucous membrane where hypertrophy and atrophy in various combinations are associated with atrophic catarrh; in atrophic conditions of the rhinopharynx associated with hypertrophic conditions of the middle ear; in otosclerosis; in tonsillitis; in cases of articular synovitis.

The effects of these applications are immediate: after one application there occurs an equalization of the circulation, shown by improved color of the face; a red face loses color and a pale one becomes rosy; the blood tension is likewise equalized; when abnormally high, a reduction generally follows; similarly the pulse is brought from either extreme closer to the normal. Repeated applications are followed by a consciousness of euphoria; an objective general physical improvement. A tonic effect is characteristic. The most striking of these general effects is the regulation of the blood-pressure, so that it tends always to approach the normal.

Compare, for instance, both the general and the local effects of the chemical stimulation of the pharyngeal pituitary as given above with those obtained by Whitbeck: "Rheumatic Arthritis Treated by the Extract of Pituitary Body." In his series of cases the regulation of the blood-pressure, from high to normal and from low to normal, is strikingly similar to that obtained by chemical stimulations of the pharyngeal pituitary; likewise, the results in the regulation of pulse and circulation are similar, as are also the local results of relief from pain and alleviation of joint symptoms.

It seems possible to say, on the foregoing evidence, that intervention in the region of the nasopharynx, whether it takes the form of adenotomy (or of scraping, splitting, finger manipulation, or forcible application to the adenoid) or of chemical application through the nose to the region of the pharyngeal tonsil, affects the hypophysis system through the pharyngeal pituitary. After adenotomy and chemical stimulation of the pharyngeal tonsil, the results in rapid growth and improved nutrition, in relief from aprosexia and morbid somnolence, etc., in freeing the system of infection and local relief of pain, in the regulation of blood-pressure, of pulse, of circulation, and of temperature, all speak for themselves as to the involvement of the cerebral pituitary in the renewed activity of the pharyngeal pituitary. Consequently, it is possible in depressed states of the pituitary system to

supply pituitary activity in either of two ways—the first, by clinical treatment of the pharyngeal pituitary through intervention in the nasopharynx; the second, by supplying pituitary substance to the system. It is very likely possible to combine advantageously the clinical and the therapeutic modes of treatment.

THE INTERPRETATION OF FUNCTIONAL RENAL TESTS.

BEER (*Annals of Surgery*, October, 1916) observes that the practical value of these tests becomes more and more evident as one succeeds in interpreting the effects elicited.

Why a given kidney (*e.g.*, a case of ureter stone) secretes more urea than its mate, but fails to excrete indigo-carmin while its mate does it normally, or why a patient dies of uremia while the phthalein output is normal or almost normal, illustrate some of the perplexities that one encounters. As the above are exceptional occurrences the important practical point in all this work is to arrive at an understanding of the significance of zero or minimal excretions, so that we may be guided intelligently and thus get the best possible operative results.

Fortunately positive results—*i.e.*, good excretion of test substances—usually mean good function. Occasionally hyperfunction, however, may accompany severe disease and be very misleading. In 1908, in a paper referring to the influence exerted by a diseased kidney on the excretory work of the second organ, Beer called attention to this difficulty. Since then Baetger has emphasized this in his presentation of cases of hyperpermeability, and Ellis Foster in his series of cases dying of uremia with high phthalein output.

Beer groups his cases as follows:

In the first group is a series of cases in which there was minimal excretion of test substances, etc., due to symmetrical renal disease usually caused by obstruction—*e.g.*, adenoma of the prostate, stricture of the urethra, interstitial cystitis, etc.—and in

which preliminary treatment failed to improve renal output and a fatal ending ensued (or threatened), due to renal insufficiency.

In the second group similar cases in which preliminary therapy succeeded in restoring function and in which operation could be successfully performed.

In the third group cases in which the lowered output was due to inhibition, toxic or reflex, and on the basis of this interpretation operation (successful) was permissible.

In the fourth group cases of more or less symmetrical renal involvement in which the kidney or kidneys had to be directly attacked before any improvement in renal function was to be expected. Success in this group of minimal excretion cases depended on rapidity of operation, substitution of gas and oxygen anesthesia (or spinal or local) for ether, and adequate drainage so as to avoid wound infection.

He concludes as follows:

1. Extrinsic causes (usually obstructive in character) may lead to permanent symmetrical renal damage, evidenced by minimal or zero excretion of phthalein and indigo-carmin associated usually with high blood urea and high incoagulable nitrogen blood content. Operation in these cases will be of no permanent benefit, and even the slightest (in one case the passing of a cystoscope) may bring on a fatal uremia.

2. Similar extrinsic causes may lead to temporary renal damage evidenced by the same phenomena as under 1. Operation in these cases, particularly after adequate preliminary treatment, will be rarely followed by uremia.

These two wholly different types of cases can be differentiated by removal of the usual causative factor—*i.e.*, relief of the obstruction, either by use of indwelling catheter or regular catheterization, or by preliminary cystoscopy under local anesthesia or gas. If the case is of the type under 1, no marked change in the renal output will result, whereas if the case is of the type under 2, the renal output will regularly improve.

A similar low combined output may be caused reflexly (inhibitive or toxic) by more or less extensive disease of one kidney, while the other kidney is adequate and improves in its function after removal of its diseased mate, or after relief of the pathological condition in its mate.

A low combined output may also be due to bilateral intrinsic causes, and improvement in these cases is possible only after operative attack on the kidneys, or the kidney, if single, under an anesthetic which has no injurious effect on the diseased kidney parenchyma; and provided no severe wound infection or other septic complications which overtax this parenchyma develop.

THE RELATION OF ARTERIOSCLEROSIS AND OTHER ANATOMICAL CHANGES OF OLD AGE TO THE DEVELOPMENT OF EPITHELIAL MALIGNANCY.

WARNER (*Surgery, Gynecology and Obstetrics*, October, 1916) has not found the various old-age conditions of endarteritis, acellular connective tissue, or fibrosis, to have been present in all cases of cancer examined.

In the study of the various abnormal conditions present in a series of non-malignant uteri, sclerosed vessels were found without carcinoma.

Many uteri, with normal vessels, showed the presence of cancer-cell infiltration.

Many cancerous uteri had only normal connective tissue, consequently without fibrosis.

Inasmuch as so many of the non-cancerous uteri showed the so-called old-age conditions, one would expect to find cancer in them more frequently, if they are a positive factor in the development of cancer.

The same may be said of the ovary, where it is quite common to find sclerotic changes in the vessels and fibrosis in the stroma without the patient having developed cancer.

Certain precancerous conditions do not necessarily develop into cancer. This is notably true in smokers' burns, some of which heal, though simulating cancer. The

epithelium in these cases simply piles up without infiltrating the tissue beneath.

Lymphocytic infiltration, even when present, varied greatly in amount. This was true not alone of the cancers but also of the various tissues used as controls, in some cases being very pronounced, in others quite slight in amount. It was especially marked in the rapidly growing carcinomata.

Of the 206 cases of carcinoma of all organs and regions examined, 105 showed arterial obstructive changes. This gives us substantially an equal division between endarteritis, 50.96 per cent, and normal vessels.

Fibrotic changes were present in 118 cases, 57 per cent.

Lymphocytic infiltration was present in 85 cases, 41 per cent.

That endarteritis and the anatomical changes of old age cannot be looked upon as a constant factor in the production of cancer is shown by the fact that normal vessels were present in almost half the cases.

The same holds true of fibrosis or even acellular connective tissue without fibrosis.

Lymphocytic infiltration, while present in less than half of the cases, plays a rôle that is protective rather than etiological.

Certain biochemical factors of a local or internal and general type are probably responsible for some cases of cancer.

THE SIGNIFICANCE OF SYPHILIS IN OBSTETRICS.

FULLERTON (*American Journal of Obstetrics*, July, 1916) observes that when a woman acquires syphilis during pregnancy, the initial genital lesion, because of the increased vascularity, is usually larger, more moist, softer, and more persistent, often lasting for twelve weeks. Although the so-called secondary manifestations are frequently scarcely noticeable, they may develop earlier, and be more pronounced than usual, the papules being larger, and the pustular forms being more common at this time. The secondaries on the vulva are the most pronounced; they are larger, more

persistent, and prone to ulcerate. The constitutional symptoms are more pronounced; the glandular enlargement is more marked; fever is more common and slightly higher; and anemia and digestive disturbances of a more severe degree are met with. Unexplained neuralgias are common.

Without question syphilis is the most common disease met with during pregnancy. The frequency of its occurrence is difficult to estimate from the meager statistics on the subject, but from a study of 10,000 consecutive cases, Williams shows its presence in over 3.5 per cent between the seventh and tenth month, and this figure would probably be increased to 5 per cent if earlier and later cases were taken into consideration.

Mall, Pearson and others estimate that for every 1000 live-born children there are 500 to 600 still-births; that is, products of gestation expelled between the time of conception and the period of viability (seventh month), or at a later period if born dead. (These figures include very few, if any, induced abortions.)

Syphilis is a common cause of sterility in either the male or the female, Nonne's material showing a 10-per-cent sterility in syphilitic unions; where the graver lesions, as paresis, are present, Haskell has reported a 45-per-cent sterility.

In eighteen syphilitic families Fournier counted 151 pregnancies, of which 85 per cent ended in still-births.

The nearer the time of conception the woman acquires her lues the more certain is her child to be syphilitic and either aborted, born prematurely or at term with evidence of the disease. Even though the mother acquire her infection in the last month of pregnancy, according to Finger, her child acquires the disease before birth in over half the cases. In Fournier's private practice, 44 pregnancies in as many women affected with recent syphilis resulted in 43 fetal deaths. He also states that 90 women infected by their husbands became pregnant in the first year of married life, which he terms *l'année terrible* from the view-point of heredity. Of these, 50 pregnancies ter-

minated by abortion or still-born infants, 38 in the birth of children which soon died, and two in the birth of children which survived.

Instances are seen which would tend to show the admissibility of Profeta's law, which states that a syphilitic woman may bear a non-syphilitic child. We have no absolute proof that these children are not infected, but when we are not able to discover in them any signs of the disease, and after years of observation no latent evidences are observed, we conclude that they were not infected before birth. Such cases, however, are comparatively rare and limited to instances where maternal infection was acquired years previous to conception, or else very late in pregnancy, though in the latter instance Finger has shown that over half the children are infected before birth. If the child becomes infected during the last few weeks before birth there may be no clinical manifestations of the disease and the Wassermann will usually be negative, as the time has been too short for either to develop; both, however, will develop at a later period.

Syphilis, unrecognized in the male or female of the second generation, may be conveyed in a marked form to the third generation.

The wives of 50 per cent of paretics were found by Haskell to be syphilitic, and in them the disease usually existed as unrecognized latent lues.

If the father be in the primary or secondary stage of the disease, the wife is almost invariably infected, with the consequences stated above.

The greater the period of time between paternal infection and marriage, the less likely is the husband to infect his wife. Even though the husband is markedly luetic he may not immediately infect his wife or beget a syphilitic offspring.

Raven, Boas, and Müller have all pointed out that very often new-born syphilitic children give negative Wassermann reactions which later usually become positive. A possible explanation of this fact is that immunizing bodies are not transmitted

through the placenta from mother to fetus, neither are such bodies formed by the fetus until about the eighth month. Roux insists that this fact should be borne in mind and not lead one to err in making a diagnosis. The percentage of positive reactions increases with the age, and the blood should not be taken before the tenth day.

The large majority of syphilitic infants die in early childhood. Luetic individuals may not show evidences of the disease until it is exhibited as late congenital syphilis, which may be first recognized as late as twenty-eight or forty years, according to Fournier and Oppenheim respectively, the maximum number of cases being at ten to fifteen years.

Among the more common evidences of late congenital lues the author mentions interstitial keratitis, epilepsy, idiocy, and imbecility (17 to 60 per cent, as given by different authors), chorea, cardiovascular disease; skeletal deformities, as "saber legs," "scaphoid scapula," and "saddle nose," osteomyelitis, nephritis, perforation of the nasal septum or soft palate, gum-mata, Hutchinson's teeth, psychopathic disorders, etc.

Syphilis produces many characteristic, if not pathognomonic, changes in the placenta, which however may vary in degree, so that although a diagnosis may usually be made without difficulty, occasional cases are met with which are of a border-line type and require the clinical history to aid in the diagnosis.

In the more characteristic cases the placenta is increased in size for the duration of pregnancy; its normal ratio of one-sixth to one-eighth the weight of the child may be increased to one-fourth or more. The placenta is pale, fatty, edematous, and of a yellowish tinge, and if the child be macerated is dull and greasy in appearance. Pronounced infarction is a common finding. As observed by Frankel in 1873, fresh specimens teased in saline solution show marked changes of the chorionic villi, which exhibit a decreased arborescence; they are thickened and irregular in size, the ends of many villi showing a distinct clubbing, and

their vascularity is markedly decreased. In section, besides the above-mentioned changes, there is seen an increase in the density of the stroma, the cells of which have lost their stellate appearance, are more closely packed, are oval or rounded in outline and resemble connective-tissue cells. The blood-vessels are greatly decreased in caliber by an obliterative endarteritis and an increase in the density of the stroma. This latter change is often seen in the umbilical vessels, and in both locations is of great importance in the production of the extensive placental infarction so commonly seen, which in turn, at least in part, by diminishing the blood supply, accounts for the poor development and frequent death of the fetus with premature expulsion.

With proper technique, spirochetæ are not difficult of demonstration in the placenta. As shown by the work of Wallich and Levaditi, Schultz, and others, they are always present if the child is syphilitic and should always be sought for if there is any question of diagnosis.

How soon after infection may a syphilitic marry with reasonable assurance of healthy offspring? Such a question is of vital importance and extremely difficult of a general answer. However, the dictum of pre-Wassermann days, that after five years of the disease, during the first three of which he had taken treatment, and during the last two of which he had had no treatment, and shown no signs of the disease, has proved to Keys and many other observers to be quite dependable. Although the Wassermann is less often positive after such a course, it is nevertheless frequently persistent, indicating the presence of active spirochetæ in the body but not their infectiousness. Therefore a persistent Wassermann is not a contraindication to marriage if the above requirements have been fulfilled.

Salvarsan is more particularly useful in cutting short the primary and secondary stages of the disease, but mercury and potassium iodide should always be used for the imperative prolonged treatment.

Fortunately all these drugs are trans-

mitted to the fetus by the placenta, by which means effective treatment may be administered to the child *in utero*. After birth the child should be treated individually, 'inunctions of mercury being most satisfactory. The mother should always continue treatment and nurse her syphilitic child, who will obtain specific drugs through her milk.

POSTOPERATIVE VENTRAL HERNIAS.

STANTON (*New York State Journal of Medicine*, October, 1916) bases his report upon 500 laparotomies from which there developed 24 hernias. All except 44 of these operations were performed through a midline or rectus incision. All of these hernias developed as the direct result of an insufficiently firm union of the fascia layers lying anterior and posterior to the rectus muscles. The entire problem of a firm scar centers in the stability of the union obtained between the sutured edges of these fascia layers.

Above the semilunar fold of Douglas the posterior sheath is composed of the entire fascia of the transversalis and the posterior half of the fascia of the internal oblique. Below the semilunar fold all of the fascia of the internal oblique and a portion of the fascia of the transversalis pass anterior to the rectus. The older anatomies infer, or state, that all of the fascia of the transversalis passes anterior to the rectus in its lower fourth. This is an error which has been corrected in some of the later anatomies. The posterior sheath even in the lower fourth does contain a fascia layer composed chiefly of fibers of the transversalis. Below as well as above the fold of Douglas this fascia and the peritoneum together form the first line of defense against hernias. The peritoneum alone has little or no strength. If the fascia is not properly united the overlying muscle yields, leaving only the last line of defense—the fascia of the anterior sheath.

Usually the posterior sheath proper is included in the suture which closes the peritoneum, but unless the presence of this

fascia is constantly borne in mind it will very frequently be missed. Between it and the peritoneum is a layer of areolar tissue which often contains a half-inch or more of fat. Even in thin people the fascia is often found deeply retracted at the close of the operation. When there is considerable subperitoneal fat it is often better to use a second continuous suture for this fascia.

Infection has long been recognized as the chief cause of a weak postoperative scar. In the series reported 260 rectus and midline incisions in originally clean cases were followed by only three hernias. One of these developed suddenly several months past operation after apparently perfect primary union in a low midline incision; one followed a Cæsarian section in which the wound broke down because of the foul-smelling suppuration caused by a proteus-like organism; and one followed a low right rectus incision in a clean case. The stitches were removed at the end of twelve days. The wound opened immediately. There was at this time no evidence of infection or repair. Four months later the wound was still open, without granulation tissue sufficient to hide the outlines of the muscle fibers. It finally closed some ten months after operation.

One hundred and eighty-six rectus and midline incisions for acute intra-abdominal infections and subacute and chronic conditions requiring drainage resulted in eighteen hernias.

Frank suppuration along the sutured fascia layers was unquestionably the cause of fourteen of the hernias in the total series. In eight of the remaining ten cases some degree of infection was present and probably in part at least responsible for the result. Only one hernia developed in a wound healing by absolute first intention. The part played by drains in the causation of hernias is usually overestimated, certainly so in the case of rectus and midline incisions. A drain up to 3 cms. in diameter at one angle of the wound does not materially increase the danger of hernia. Indeed, since it provides drainage it is a means of preventing rather than causing

hernia. Of 180 midline and rectus incisions in which drainage was employed there were 15 hernias, and in only three of these could the development of hernia be traced to the site of the original drainage. In 12 it was apparently clear that the hernias first developed in the sutured portion of the incisions. A reference to the hospital records in these cases shows ten of the twelve were complicated by well-marked suppuration extending along the fascia layers.

In no case was Stanton able to ascribe a hernia to meteorism. Nor was there a single instance of rectal paralysis due to interference with the nerve supply. The fascia of the posterior sheath is the first line of defense. Suture of the peritoneum does not necessarily mean that the fascia is also sutured.

The author seemed to think that the McBurney incision is more frequently followed by hernia than any other.

USE OF PICRIC ACID IN WAR SURGERY.

On the basis that picric acid is four times more potent than carbolic acid in bactericidal properties, and that a one-per-cent solution kills streptococci and staphylococci in two minutes, BROWN (*Lancet*, Sept. 2, 1916) states that during the Gallipoli campaign, as officer commanding No. 1 Australian Auxiliary Hospital in Egypt, an opportunity presented itself practically to test the value of picric acid in the treatment of over 3000 wounded patients. The medical officers and nursing staff carried out the following routine treatment as far as practicable: To superficial wounds 1 per cent picric acid solution was applied on thin gauze. The wound was thus left practically exposed to the air; usually one dressing per day was sufficient. Suppurating sinuses were treated by syringing with 0.5 to 1 per cent of the solution twice daily, and H_2O_2 solution used every two or three days to remove débris. Arm and leg baths with 0.5-per-cent solution for thirty minutes were used for suppurating fractures

and crushed tissues, with an occasional bath of hypertonic saline as a change.

The results were uniformly good, healthy and vigorous granulation and quick recovery taking place. Several cases of septic compound fracture and injuries to bone cleared up in a remarkably short time. Deep septic wounds caused by shrapnel, etc., granulated and were ready for skin-grafting likewise.

It must be noted, however, that they found 1-per-cent solution too strong for the delicate epithelium of new skin, and weaker solutions, 0.5 per cent and 0.2 per cent, were used when the granulations reached the level of the surrounding epidermis. It may be mentioned here that a 0.2-per-cent solution in water and spiritus vini rect. was used in several cases of erysipelas with excellent results.

The following opinions of the properties and value of picric acid solution are based on the cases treated: It kills bacteria without corroding effect and prevents suppuration; it stimulates granulation of the tissue; it has marked anodyne properties, and the need of aspirin or morphia is rare; by dispensing with hot fomentations it saves much time, cotton-wool lint, G. P. tissue, etc.; it is less irritative and more efficacious than iodine; it may be used for sterilization of the skin in surgical cases; it shortens the convalescent period.

The contraindications usually mentioned are the following:

Coagulation of the tissue. This is so slight with the solutions used that it was unnoticeable, and there was no evidence of retardation in the healing of wounds from this cause.

Poisoning effects. In the 3000 cases treated not one showed any signs of poisoning. Moreover, the writer has painted a patient suffering from scarlet fever all over with a 2-per-cent solution without any signs of absorption or poisoning, and believes that it hastened the peeling stage.

Discoloration of the skin. This is very persistent, but the muscles and subcutaneous tissues apparently do not stain.

So far the opportunity has not presented

itself to investigate the result of applying picric acid as a prophylactic in tetanus.

The number of septic wounds arriving at the base calls for more vigorous treatment in proximity to the scene of action. Brown suggests that picric acid be stocked by all dressing stations, clearing hospitals, and field ambulances, if not already in use. A useful form would be compressed tablets, which, when dissolved in 1 ounce of rectified spirit and 9 ounces of water, would form a 2-per-cent solution. This is applied to all wounds on gauze as a first dressing, or when practicable the wound syringed with a 1-per-cent solution and then covered with gauze saturated with a 2-per-cent solution.

POSTOPERATIVE HEAT-STROKE.

MOSCHCOWITZ (*Surgery, Gynecology and Obstetrics*, October, 1916) reports a number of cases, two at least of which seem convincing. He believes that whenever the atmospheric conditions are favorable for the production of insolation, all operating-room activities should cease, with the exception of those of an urgent nature. It is quite within the range of possibility that insolation may occur even in a non-operated individual, but the exhaustion dependent upon the operation is lacking, and may be just the factor which determines the occurrence of insolation, and the success or failure of the treatment instituted.

In all cases operated upon during a hot wave, the greatest regard should be had for the comfort of the patient. As already indicated, all the needless swathing in blankets and hot-water bottles is to be prohibited. On the contrary, at such times coolness and the lightest of covers are indicated. Motor fans are also in order and desirable. Cooling drinks should be permitted much earlier than is generally the custom after operations.

Only that particular form of insolation which is characterized by very high temperatures and which is called "heat-stroke" has been recognized as a postoperative com-

plication. This is perhaps due to a lack of our diagnostic acumen, as it is quite possible that the second variety, or "heat prostration" so called, is the more frequent. While the etiological factor appears to be identical in both, they differ widely in their symptomatology, and what is of the greatest importance also, in the therapy.

In heat-stroke the temperature is so high that every effort should be made to reduce it, and to neutralize its deleterious effects. We cannot avail ourselves in these cases of the antipyretic properties of the coal-tar products, on account of their depressing effect upon the heart. Recourse must be had, therefore, to physical measures to reduce the temperatures. The best of these is hydrotherapy properly executed and carried out, in the form of sponge baths with iced water. An ice-cap applied to the head is not only grateful to the patient, but materially assists in reducing the temperature, and in combating the delirium of the patient. Enemata or Murphy infusions with ice water, coming into contact with a large volume of the superheated blood, should also be tried, and will also be followed by success. This form of treatment would, on the other hand, be entirely contraindicated in that variety of insolation which we call heat prostration. In this form the temperature is not only not elevated, but in many cases is even subnormal. The reverse form of treatment is therefore indicated, namely, the patient should be well covered and surrounded by hot-water bottles; subcutaneous or intravenous saline infusions, or warm rectal infusions, are used.

The rate and quality of the pulse is to be controlled, and forms a valuable guide as to the character and amount of stimulation called for.

In a certain number of cases of insolation there has been found a peculiar degeneration of the blood, which manifests itself by a laking. This suggests the possibility of venesection and blood transfusion, provided a suitable donor can be found at short notice.

REVIEWS.

INDEX-CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, UNITED STATES ARMY. Authors and Subjects. Volume 21. Waerwörth-Zysman. Government Printing Office, Washington, 1916.

This issue of the Index-Catalogue, already known to all men in this country and abroad who work in medical literature, contains 7211 author titles, representing 4971 volumes and 5496 pamphlets. It also contains 2026 subject titles of separate books and pamphlets and 12,175 titles of articles in periodicals. The library of the Surgeon-General's office now contains 224,522 volumes, bound and unbound, 337,120 pamphlets, or a total of 561,642. Exclusive of transactions of societies, the number of current periodicals at present on file in the library is 1895. The present volume completes the Second Series of the Index-Catalogue, comprises 21 volumes, or a total of 37 volumes in the First and Second Series. Not only the medical profession of the world, but the whole country, is to be congratulated upon the maintenance and successful carrying out of this noble work.

PHARMACOLOGY AND THERAPEUTICS. For Students and Practitioners of Medicine. By Horatio C. Wood, Jr., M.D. Second Edition. J. B. Lippincott Company, Philadelphia, 1916. Price \$4.00.

The second edition of Dr. Wood's book is somewhat larger than the first. It opens with a chapter upon Elementary Facts Dealing with Pharmacology and Therapeutics, and then continues with various chapters in which drugs are classified according to what is believed to be their physiological action. Thus, there are chapters upon Drugs Used to Affect Secretion; Drugs Used to Affect the Nervous System; to Affect the Circulation; the Alimentary Tract; the Metabolic Processes; Drugs which Act on the Causes of Disease; Extraneous Remedies; and Drugs of Minor Importance.

Much can be said for and against the classification of drugs by the arbitrary methods which are essential if any attempt at classification is made. It would seem rather an artificial classification to put min-

eral acids and the digestive ferments under the class of Extraneous Remedies when the thyroid gland is put in another classification. The book deals more largely with the pharmacology of drugs than it does with their clinical application.

An interesting and attractive feature of the book is the frequent use of the pronoun "I" by the author, whereby a personal quality is given to the text. Wherever it is thought necessary the author introduces references to papers which he considers of great importance in connection with the drug which is under discussion.

The volume is one which reflects credit upon a name which for nearly one hundred years has been intimately associated with materia medica and therapeutics in American medicine.

A PRACTICAL MEDICAL DICTIONARY. By Thomas Lathrop Stedman, A.M., M.D. Fourth Edition, Revised, Illustrated. William Wood & Company, New York, 1916. Price \$5.00.

Few men of the medical world have had larger editorial experience than Dr. Stedman, who has been the Editor of the Twentieth Century Practice of Medicine, of the Reference Handbook of the Medical Sciences, and is at present Editor of the *New York Medical Record*.

The present volume appears in a flexible binding and is good to look upon. It appears two years after the third edition. Special attention has been paid to the names of authors of tests, discoverers of reflexes, and inventors of surgical or other procedures. The domain of radioactivity has been culled and nearly two thousand new terms have been added to the present volume.

In earlier editions the terms of the Basle Anatomical Nomenclature (B N A) were indicated only when they differed from those in common use, but in the present edition it has been thought best to mark all of these terms, and for this purpose anatomical assistance has been called upon by the author.

The paper used in the volume is thin but tough, and therefore ought to wear well.

The register does not show through, and the type is sufficiently large to make reading of the definitions easy.

As a specimen of literary work and a sample of book-making it can be most highly commended.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by L. F. Appleman, M.D. Volume 4, 1916. Lea & Febiger, Philadelphia, 1916.

The contributors to the December issue of *Progressive Medicine* are J. Harold Austin, Associate in Medicine in the University of Pennsylvania, who writes the article upon Diseases of the Kidneys; Edward H. Goodman, also an Associate in Medicine in the University of Pennsylvania, who contributes that upon Diseases of the Digestive Tract and Allied Organs; Charles W. Bonney, who contributes the article upon Diseases of the Genito-Urinary Tract; Joseph C. Bloodgood, Associate Professor of Surgery in the Johns Hopkins University, who writes upon Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures and Dislocations, and Tumors; and, finally, a Practical Therapeutic Referendum, summing up most of the articles of importance appearing during the year, compiled by H. R. M. Landis, who is Director of the Clinical Department of the Henry Phipps Institute. These articles have all been written with the idea that the author impresses his personal opinion upon their pages as well as quotes the opinions of those who contribute the articles which he dissects and abstracts.

A TEXT-BOOK OF HISTOLOGY. By Frederick R. Bailey, A.M., M.D. Fifth Revised Edition, Profusely Illustrated. William Wood & Company, New York, 1916. Price \$3.75.

This very excellent book of histology was warmly admired when it appeared in its first edition, and it is worthy of note that it has proved so popular as to reach a fifth edition within a very short time, considering the fact that comparatively few active practitioners have use for such a volume and that its chief sale must be

amongst students. The illustrations are remarkably clear and good. In addition to the description of the tissues which are shown, there are also definite and accurate directions as to the technique which should be employed in the staining and examination of the chief tissues.

BLOOD-PRESSURE FROM A CLINICAL STANDPOINT. By Francis Ashley Faught, M.D. Second Edition, Illustrated. W. B. Saunders Company, Philadelphia, 1916. Price \$3.25.

This very excellent summarization of the literature concerning a large and important topic has now appeared in its second edition. In addition to giving many references dealing with this subject, the author does not hesitate, from time to time, to express his own individual opinion as to the conditions which are indicated by, or which are to be studied through, estimations of blood-pressure. The book is somewhat larger than need be by reason of its large type and the wide spacing of the lines. These qualities, however, make it easy reading. It has been brought up to date and deserves to be well received by the profession.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume V, Pediatrics. Edited by Isaac A. Abt, M.D., with the Collaboration of A. Levinson, M.D. Orthopedic Surgery. Edited by John Ridlon, A.M., M.D., with the Collaboration of Charles A. Parker, M.D. Series 1916. Chicago: The Year Book Publishers, 1916. Price \$1.35.

In admirably done portions of this work we find sections devoted to Metabolism, Feeding, Infant Welfare, Pyloric Stenosis, Duodenal Ulcer, Intestinal Invagination, Disorders of Nutrition, Schick Test, Poliomyelitis, Syphilis, Tuberculosis, Respiratory Diseases, Blood Transfusion, Colon Disease, Disease of the Urinary Organs; Heart Disease; Rheumatism; Disease of the Nervous System; Tumors; under each heading giving a brief but excellent summary of the important contributions during the last year. Ridlon and Parker's résumé of Orthopedic Surgery is equally commendable.

Dislocation of the Hip; Hip Disease; Arthritis; Pott's Disease; Scoliosis; Painful

Back; Infantile Paralysis; Flatfoot; and a brief section on Fractures—these are the subjects lightly touched upon.

CONSTIPATION, OBSTIPATION, AND INTESTINAL STASIS. By Samuel Goodwin Gant, M.D., LL.D. Second Edition, Enlarged. Illustrated. W. B. Saunders Company, Philadelphia and London, 1916. Price, cloth \$6; half-morocco, \$7.50 net.

The call for a second edition of this excellent book indicates the favor with which it has been received in the past and the confidence of the profession in the author's thorough revision and recognition of modern methods. He states that drugs are very rarely employed by him in the curative treatment of constipation. He discusses the functional, prophylactic, psychic, dietetic, physical, and medicinal treatment of chronic constipation; after which separate chapters are devoted to the treatment of complications, spastic constipation, acute constipation, and the constipation of infants and children. There are brief introductory chapters upon Anatomy and Physiology. Thereafter there is devoted space to the Etiology, followed by Symptomatology, and, finally, by a very

elaborate therapy, Internal and External Hydrotherapy being given much space. Massage and Vibrations are carefully described, together with the use of Electricity and other Physical and Therapeutic Procedures. There is a chapter of some length devoted to the Medical Treatment of Constipation, together with many admirable prescriptions. The latter end of the book is mainly surgical.

THE PRACTITIONER'S VISITING LIST FOR 1917. Lea & Febiger, Philadelphia, 1917. Price \$1.25.

This so-called "Practitioner's Visiting List," which has now been published for many years by Lea & Febiger, appears in the same form as heretofore. To be more exact it appears in four styles: weekly, dated, for thirty patients; monthly, undated, for 120 patients per month; perpetual, undated, for thirty patients weekly; or "sixty patients" undated for 60 patients weekly per year. The preliminary matter contains a scale of dentition, weights and measures, instructions for examination of the urine, diagnosis of eruptive fevers, incompatibilities, etc.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

As autumn passes into winter, the natural sequence of shorter days becomes obvious. This is more noticeable this year than last, owing to the greater stringency of the lighting orders. London streets are indeed very dark, as it is not permissible for any light to show which is sufficiently strong to illuminate, however slightly, the opposite side of the roadway. This is of very little material consequence when the atmosphere is clear, but with the development of fogs, and we have already experienced several in this present month, passing along the streets is worse than walking along a country lane at

night, and is much worse than fogs in former years when the streets were well lighted. The reason for this is that as you walk along the street you come into an area of light thrown downward from the street lamp, and then immediately proceed into an area in which no light is shown, the result being that your eyes are dazzled just as they are when passing a motor car with bright lights in the country. Efforts were made to whiten the edges of the curbs of the pavements in order to indicate where to step down or up, but with damp fog and muddy streets this is very quickly obliterated, so that the attempt is not so frequently made now as a few weeks ago. The fall of rain also tends to obliterate these white marks. Rain itself has not been so notice-

able during the past month until last week, when it was very heavy. On November 19 there was a sharp fall of snow, amounting to several feet in some of the northern parts of the country, but only to the extent of a few inches nearer London. It was followed by twelve hours of rain, and as a consequence did not lie at all, but following the snow and rain the atmosphere has been quite heavy and there is a tendency to the continuance of fogs.

Military patients keep coming over, but care at the front seems to have eliminated the more serious diseases. There have not been so many patients with albumen, and I have seen none with trench feet. There seems to be considerably more shell-shock than formerly, and it is just a question as to what extent and in what time these patients recover. The general experience is that the older they are the less chance there is of their recovering sufficiently to return to the front, and the greater time required before that event is possible. Recurrent headaches seem to be the characteristic phenomena of the condition, and it is well to have any errors of refraction corrected in order to get this condition relieved. This and sleeplessness are the most troublesome symptoms. Occasionally, however, peculiar symptoms show themselves. I recently had under my care an officer suffering from shell-shock who was a good golfer with a handicap of +2. When he had recovered from the severe symptoms of the condition, he was sent off into the country to play golf. Although a 13-stone man of very fine physique, he was at first completely done up at the end of nine holes, and it was not until after a month that he could get through a complete round. He was considerably annoyed by his game, as he was continually beaten by an 18-handicap man playing on level terms. He could get to the green in the regulation number of strokes, but although having been a very fine putter previously, he had entirely lost his touch, and confessed that when he struck the ball his direction was always good, but he had no notion whether the ball was going 5 feet or 15 yards, and he nearly

always took four strokes to hole out. This part of his game has commenced to improve, but only after two months on the links. He took it all in good part, or otherwise the annoyance might have been an adverse factor in his case.

The war is very naturally causing a considerable amount of embarrassment to the London hospitals. Rent, rates, and taxes remain about the same, but everything else seems to have risen—not only food, but drugs, dressings, and wages. Owing to the increased cost of living, practically all permanent officials, porters, and so forth have been granted a war bonus especially to provide for this increased cost of food. Younger hands have been called up, being replaced by older men and a certain number of women, but in many cases where this has happened a weekly grant is given to those with the colors to supplement the army allowance. In those hospitals where resident medical officers receive a salary, the rate of remuneration has had to be raised in order to secure resident medical officers, and it seems likely that such rates will eventually reach those paid to the medical officers in the R. A. M. C. A few of the hospitals are in the fortunate position of being endowed with a sufficient permanent income to provide for the increased cost, but the less fortunate ones are affected by the falling off of subscriptions actual or relative, and if hostilities continue will be hard put to it to keep going. It is naturally difficult to raise money for these charitable institutions when there are so many other calls on charity, and especially when such calls are connected with the effects of war. It is therefore all the more to be hoped that the King Edward's Hospital Fund, the Hospital Sunday and Hospital Saturday Fund will be well supported, and will be able to keep their grants up to the usual level. In some quarters there is considerable talk of state subsidy for some or all of the hospitals, but no public statement has so far been made in this connection.

The subject of venereal disease, and the arrangements made to cope with it both now and in the future, is still the most

important medical subject before the public, and every day letters appear in the daily papers bearing on this point. While the majority of these letters are written by those who wish to associate themselves, but are somewhat belated, with the movement and advocate an energetic programme, it is noticeable that they all fight shy of notification of this disease. This aspect has been studiously avoided in all schemes, but it seems to be one that will ultimately have to be dealt with, although popular opinion at the present time seems to be against it. It seems very doubtful if this condition will ever be eradicated without some compulsory form of treatment and notification, however much the public may be educated as regards the consequences which may arise. I understand that the County Council have now elaborated their scheme and have practically concluded arrangements with the different centers in London where treatment may be obtained. Grants will be made to these centers, which will be left to disburse the money at their own discretion, the County Council only requiring that the work should be satisfactorily carried out. The great principle is that all treatment and examination should be free, and in this respect an interesting position arises with regard to those hospitals which have specially laid themselves out for the treatment of the conditions, but where the institutions have been self-supporting owing to the fact that each patient contributes to the cost of maintaining the institution. It will obviously require a much larger grant than that allowed some of the general hospitals where the diseases have only been treated in the ordinary hospital routine, and where no payment has been made. We have not yet heard how this situation will be dealt with.

Attention has recently been called to another branch of public health, viz., the arrangements made for the provision of midwives throughout the country. A large number of nurses after their training take

some diploma in midwifery, but in their case the diploma stands very much in the same relationship as a diploma of public health does to a large number of medical men who go into practice. It rounds off a course of study, but does not necessarily imply that the owner intends to practice exclusively in that branch of the subject. In the last year or two the number of those who intend to devote themselves to this branch of nursing has been limited. At the present time it does not seem to attract sufficient numbers, and the dearth is being felt throughout the country. It is largely a matter of payment. In some of the outlying country districts the fee varies from 5s. to 7s. 6d. per case, which would represent an income of a little over £13 in a year. In these country districts accommodation is provided for the nurses when off duty and food when not attending cases, but the sum is of course absurd, and at the present time offers no attractions. This is of course the worse side of the picture. In some towns it is just possible that nurses could earn a little more than £100 a year, but even that amount does not compare with sums that are earned in some munitions factories. The Local Government Board are now taking the matter in hand with the object of establishing efficient midwifery centers throughout the country, and are giving grants to the County Nursing Association with respect to this work. The town of Bradford, which has always been to the fore in public health, is now advertising for a municipal midwife. It is only reasonable that the state, which has always taken such a great interest in the death of its members, should now turn its attention to securing better conditions for their birth. The first step toward instituting an efficient service of fully trained midwives is obviously to see that the present staff is contented, an object which would be best achieved by undertaking that they receive a proper salary and proper recognition.

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ORIGINAL COMMUNICATIONS.

PAINLESS CHILDBIRTH.

BY EDWARD P. DAVIS, M.D.,

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So long as labor has been intelligently studied, efforts have been made to lessen the suffering which attends childbirth. One of the earliest substances used for this purpose was crude opium partially dissolved in wine or a compound of aromatics. Forty years ago when hydrate of chloral was in common use, experienced obstetricians were accustomed to soak tampons of cotton in a saturated solution of chloral hydrate in glycerin and place them against the cervix of the primipara when dilatation was slow and painful to lessen suffering and further dilatation. Hydrate of chloral was given internally until the patient became under its full physiological effect to lessen suffering. When cocaine was introduced solutions of cocaine were injected into the cervix and into the skin of the perineum and the surrounding tissues.

The method of nerve blocking so extensively employed in surgery is proposed for perineal anesthesia in labor. Novocaine and adrenalin chloride are injected bilaterally into the perineum. King (*Surgery, Gynecology and Obstetrics*, November, 1916) states that in one hundred cases his results have been good.

The discovery of ether and chloroform led to their immediate adoption by obstetricians. When chloroform was first known it is alleged that a European queen awaiting confinement summoned Sir James Simpson and instructed him to use this agent to lessen her pain. It had been objected by the clergy that it was written in Scripture that women should bear children

in pain and travail, and therefore that efforts to lessen the pain of parturition were contrary to Scripture. To this the Queen replied that the ecclesiastic who promulgated this doctrine had never borne a child, that she had passed through that experience previously, and that she proposed to have chloroform, and she did.

In recent times the attention of the profession has been largely directed to the question of antisepsis and asepsis in the conduct of labor, and naturally the public mind has been drawn more in that direction. All obstetricians have habitually employed ether or chloroform and frequently opium to spare the patient unnecessary suffering and fatigue.

A distinction should be made between labor pains and the suffering incident to parturition. The phrase labor pains refers to uterine contractions, and it is interesting to observe in a spontaneous and almost natural birth that severe uterine contractions affect the pulse and heart scarcely at all. The sympathetic nervous system does not seem to be extensively involved in this process. An explanation of the fact may be found in the anatomical conditions of the nerve supply of the uterus. Through its ganglia and nerve fibers it is capable of contractions independent of stimulus received from the brain or spinal cord; hence its action, although severe in actual force, exerted often, has surprisingly little effect upon the patient's general condition. The suffering of parturition depends upon the sensitiveness of the brain and cord and not

necessarily upon the uterine contractions. This is illustrated in the case of a highly sensitive, mentally and physically degenerate woman who cannot bear pain, and who may fail absolutely in labor, require delivery under an anesthetic by forceps, and readily pass into shock when the uterus is emptied. On the other hand, the sound and vigorous peasant woman or a negress who has worked in the field may give birth to children with very little disturbance of brain and cord.

The problem before the obstetrician at present in the conduct of labor is the question of protecting the brain and cord of the patient from the sensation of pain, and from the psychic and emotional element which depresses the woman when she feels that she is becoming exhausted. This may be done by endeavoring during pregnancy to bring about as nearly a physiological condition of the patient as possible, reënforcing her general energy and health; by ascertaining positively if any insurmountable obstacle to spontaneous birth is present; by interfering to terminate labor before exhaustion develops; by using a psychic influence during labor; by employing drugs and anesthetic vapors as indicated; and by prompt recourse to obstetric surgery when necessary. The problem is a large one and often difficult of solution.

We are concerned at present with those means of treatment which are not surgical, and we shall not consider further the question of the hygiene of pregnancy.

The psychic influences which should prepare the mind of the patient for spontaneous and successful labor are often overlooked. An atmosphere of hope, cheerfulness, and kindness should surround the expectant mother. Forebodings and unnatural fear often have a physical cause, and the occurrence of such should lead to a thorough physical examination of the patient. The relief of a toxemic condition is usually followed by a marked improvement in the mental state. The proverbial tendency of gossips to tell a pregnant woman stories of painful, difficult, and fatal labor should be guarded against and

carefully checked. At a time like the present when the horrors of war are widespread throughout the earth, the woman expecting labor should avoid the details of battle and the sufferings which accompany war. Faith, whether religious or philosophical or in an individual, is a valuable psychic agent and should be invariably encouraged. If the patient asks questions concerning approaching labor, they should be answered in such a way as not to depress nor rouse suspicion. She should be assured that she will receive at that time every assistance and every care to avoid suffering.

During the first stage of labor the attentions of a skilful nurse are often of great value in soothing and encouraging the patient. This is the period when drugs may be used successfully to calm the brain and, should labor begin in the evening, to secure sleep. As labor progresses into the stage of active expulsion, the suffering of the patient is often more readily borne than during the first stage. The complete pause between expulsive pains in normal cases gives the opportunity for absolute rest which the nagging pains of the first stage have made impossible. At the actual moment of expulsion pain caused by the pressure of the presenting part on the nerves of the pelvic floor may induce spasm and further extensive laceration, and here the element of pain should be eliminated as completely as possible. It is often interesting to observe that treatment addressed to suffering during labor often takes the brake from the uterus, and is followed by better and more efficient uterine contractions.

Within recent years the attention of the profession has been drawn to two methods for securing painless childbirth: the first, the so-called twilight sleep of Krönig and Gauss; the second, inhalation of nitrous oxide and oxygen.

Regarding the first little need at present be said. The subject has been thoroughly discussed by the profession. At present, the popular agitation concerning the method has entirely subsided, and the activities of the agents of foreign drug manufacturers

intent on the sale of their preparations of scopolamine have ceased. The profession need scarcely be reminded that a concerted effort was made to secure American trade in scopolamine by foreign manufacturers, and that the popular agitation concerning the method was largely promoted by these agencies. The climax of vulgarity was reached when a moving picture exhibit of parturition was attempted and promptly repressed.

At present it is recognized that this method to be successful must be carried out strictly in the manner described by those who have used it most successfully abroad. First, the psychic control of the patient must be absolute; isolation, the absence of friends and relatives, the presence of a skilled attendant, the authority of professors, must all be invoked. Reliable preparations of scopolamine only, with morphine, must be employed. The effort is made to annul memory in the patient, not to prevent pain, and when this is considered and the large part played by psychic influence is observed, it will be seen that the method depends quite as much on psychic control as on the influence of drugs. The results of the method have been the prolongation of labor, a considerable percentage of asphyxia in the infants, and a considerable percentage of forceps applications. That the psychic condition of these patients has been profoundly influenced is evident, for in cases in which the memory of pain was not annulled, excitement, often of a violent nature, developed. Practical experience with the method has failed to make it an established and routine practice in the best obstetric clinics of the United States.

In the *British Medical Journal* of October 14, 1916, Haultain and Swift described their experiences with the use of morphine and hyoscine in the Royal Maternity Hospital of Edinburgh. They practically make no difference between hyoscine and scopolamine and consider that they have followed out the method described by Krönig and Gauss by employing hyoscine and morphine. They remark that the pharmacology of

hyoscine and scopolamine, as it is sometimes called, is not very definite. In their paper they give no evidence of having read Krönig's description of his method, and their references to the literature of the subject are confined exclusively to English authors. In describing their treatment they would begin injections when the os admits two fingers and pains are regular with primiparæ; with multiparæ the method cannot be employed too early after pains have started. They would not repeat the morphine in the latter part of the second stage, fearing asphyxia of the child. If the hyoscine is not taking effect in the second stage during its latter part, it is well, they say, to give the mother a slight whiff of chloroform; thus the hyoscine is allowed to work and the patient passes into the condition of "twilight sleep." The baby should be immediately removed to another room, so that the mother cannot hear the cries of the child and remember that she has given birth to an infant. In their conclusions they state that it is of great value in a prolonged second stage due to a large head or slightly contracted pelvis, and that it has the advantage over chloroform that uterine contractions are not diminished. As proof of the value of the method they state that the great majority of their patients got out of bed on the third day after labor. This late contribution to what in America is a stale novelty does not increase our confidence in this treatment. The use of ether during the second stage of spontaneous labor does not seem to have occurred to the writers, and the proposition to increase the action of hyoscine by administering chloroform does not appeal to us.

Very recently the attention of obstetricians has been drawn to the administration of nitrous oxide and oxygen to secure painless childbirth. The statement has been made that this may be safely done through practically an entire labor, that it may be entrusted to a nurse who has had no special training in anesthesia, that the method is absolutely devoid of danger, and that under this anesthetic obstetric operations can readily be performed. Unfortunately, these

claims are not borne out by experience. Nitrous oxide and oxygen have been used by skilled anesthetizers for some time for minor procedures, and often in beginning surgical anesthesia followed by ether, but it is observed that some patients do not do well with this, and that irritation and excitement ensue, and sometimes disturbed breathing, so that other anesthetics must be employed. Furthermore, muscular relaxation will not readily be secured in parturient women by nitrous oxide and oxygen, and if it is desired to secure relaxation of the pelvic floor for the introduction of the forceps or to stop the contractions of the uterus for the performance of version, the obstetrician will do well not to trust to nitrous oxide and oxygen. No anesthetic is safe in untrained hands, and ether dropped on gauze or upon a clean handkerchief is far less dangerous than any anesthetic known at the present time. In the wards of the Maternity Department of the Jefferson Hospital nitrous oxide and oxygen have a fair trial, and it is recognized that in a considerable number of cases a spontaneous labor is rendered less distressing than when this agent is not employed. Some patients are excited and not soothed by it, while in no case is a prolonged or critical operation undertaken under this anesthetic. In private practice the writer has given it a fair trial, administered by a skilled anesthetist. In some cases in which it was desired to induce labor or to produce therapeutic abortion, or to perform some manipulation which might be painful but not prolonged, nitrous oxide and oxygen given skilfully have been useful, but private patients who have in former labors taken ether and in

later confinements have been given nitrous oxide and oxygen have expressed their dissatisfaction with the latter method.

What does the reliable experience of the obstetric profession indicate in this matter at present? During the latter weeks of pregnancy and the first stage of labor psychic influence and good nursing will do much. In the tedious and nagging pains of the first stage the bromides may suffice, but a reliable and efficient remedy is opium, morphine, and atropine given once hypodermically, and if needed codeine given later. During the expulsive stage of labor small quantities of ether with oxygen or freely diluted with air; at the moment of expulsion, the patient to inhale the ether as quickly and freely as possible, and the anesthetic to be removed so soon as the child is born, may be used. For repair of lacerations after labor, ether again is safest. Very little is usually required. For prolonged and critical obstetric operations, oxygen should invariably be given with ether. The amount of irritation is less, asphyxia is less, and subsequent nausea and vomiting are less. Nitrous oxide and oxygen administered by a skilled person may be used cautiously, but they are not to be relied upon to secure muscular relaxation.

Strictly speaking, painless childbirth is very difficult or practically impossible except in cases of elective operation where the patient is delivered without labor. During labor the general principle true in surgery is especially true in obstetrics: "Safe anesthesia is only possible when the anesthetic, whatever it be, is given by a skilled anesthetist."



ANESTHESIA IN OBSTETRICS.¹

BY WALKER B. GOSSETT, M.D., LOUISVILLE, KENTUCKY.

Like the majority of other obstetricians, I have employed all kinds of anesthetics during childbirth. First came chloroform, which of course I began to use over twenty years ago when starting in the practice of medicine. Ether has been employed less extensively as an anesthetic in obstetrical work. The dangers of these drugs are too well known to require further comment. Moreover, when given in insufficient amounts to induce analgesia, and in quantities sufficient to induce anesthesia, the object sought to be accomplished in childbirth is defeated—i.e., the expulsive efforts are necessarily minimized and labor is retarded unless instrumentally completed or pituitrin administered. Many physicians refuse to administer chloroform in labor unless the patient demands it. One can never be certain in advance just what effect chloroform will have upon the patient. I remember one woman at the Jewish Hospital who took only a small quantity of chloroform, but it made her so drunk that she could give absolutely no assistance during the delivery. I tried in every way to induce her to "bear down" to assist in delivering the shoulders, but she was unable to do so. I happen to have small hands, and was finally able to insert my fingers behind the shoulder, and in that way delivery was completed. I am aware of a physician in the city who lost a baby under similar circumstances after the head had been extruded.

The next method was the intraspinal injection of a solution of cocaine. I believe I was the first obstetrician west of the Alleghany Mountains to use cocaine in labor. Dr. T. S. Bullock administered it for me in three cases at the Louisville Medical College Hospital. We thought then that we had discovered a perfect anesthetic in labor. After the intraspinal injection of cocaine there was absolutely no pain, the uterine contractions were just as strong and as frequent as if nothing had

been given, and the patient talked and laughed all the time during the delivery. In these three cases no bad results were noted, but about that time a report came from somewhere in the East that in a number of instances spinal abscesses had developed from the puncture. Of course that put a stop to our intraspinal injection of cocaine solution in obstetrical cases.

Then came the so-called twilight sleep. I was opposed to this method from the beginning, because I had tried it several years before, using the tablet containing morphine, hyoscine, and cactine. Complete anesthesia was not induced; we gave these drugs as we had formerly administered morphine in obstetrical work. The regular twilight sleep, according to the Freiberg method, I always believed was dangerous, but was compelled to use it in certain cases in which the patient demanded it. I was fortunate enough not to lose any of the babies. I consider twilight sleep dangerous to the mother, but particularly so to the child. Shortly after this method became popular a nurse in the Jewish Hospital told me a friend of hers in Cincinnati, Ohio, had been delivered under twilight sleep, and that the baby was born asphyxiated. At that time I inquired of several physicians who were using it and also searched the records, and found that many of the babies were born cyanosed and great difficulty had been experienced in their resuscitation. In one of my private cases the baby showed slight cyanosis for a few minutes, which caused me considerable uneasiness. At that time the secular magazines contained such glowing accounts of the Freiberg method that we were almost compelled to use it, but after the unpleasant experience just mentioned my patients were informed that twilight sleep would not be used unless they would assume the entire responsibility so far as safety of the child was concerned. Every prospective mother was told in plain language that I was willing to take the responsibility so far as she was concerned, but as to the life of the baby she would

¹Address before the Louisville Medical Club, of Louisville, Kentucky.

have to assume that responsibility if she insisted upon twilight sleep being used. The majority of them replied that if there was danger to the baby of course they did not want twilight sleep. From that time I have not used twilight sleep, as I always present the matter plainly to the prospective mother, and when assured that there is an element of danger to the life of the baby she does not want it. The woman is always told that she will not be allowed to suffer unnecessarily, that chloroform will be administered if required.

Next came the suggestion of using nitrous oxide gas and oxygen in labor, and I do not understand why we did not think of this plan years ago. The dentists have been using gas in their work for many years, it has also been employed in surgical practice, and why we did not think of it before in obstetrical work I do not know. I have had gas used in four cases, the charge for each administration being about twenty dollars. Where the patient has to pay this price for gas and fifty dollars for the delivery, it becomes a rather expensive proposition which many people cannot afford. Moreover, the patient objects to paying the anesthetist nearly as much as the obstetrician.

Case 1.—The first time I had gas used was in the case of the wife of a physician to whom I was called when she was in labor. In several previous deliveries there had been trouble about extension of the head, and instruments had to be employed. Examination showed that the cervix was thoroughly dilated and the head presented in the L. O. A. position. Prior to commencing the gas a dose of $\frac{1}{2}$ Cc. pituitrin was administered. We waited until this began to act, then the gas was started. The head descended normally; when it had reached the perineum, the quantity of gas was increased, the head was delivered immediately, and the gas was withdrawn. The woman was semiconscious during the entire time, and after extrusion of the head was told to bear down, and no difficulty whatever was experienced in delivering the shoulders. She had previously given birth to several children, and remarked that this

was the easiest and most satisfactory labor she had ever experienced.

Case 2.—In the second case there was an occipitoposterior position, and delivery was instrumentally completed. The labor was very difficult and gas was given to complete anesthesia. When the head was extruded the woman was sufficiently conscious to bear down and thus assist in delivery of the shoulders. In this case I gave three or four doses of pituitrin $\frac{1}{2}$ Cc. each.

Case 3.—The third case was a primipara nineteen years old. Gas was started when the cervix was about three-fourths dilated. The only reason she went to the hospital to be delivered was that I promised if she would go there gas would be administered. A special nurse might have been engaged to take care of her at home, as the people could well afford the expense, but she went to the hospital where gas could be given. Her labor was short, the second stage lasting only about an hour. Delivery was easily accomplished, and when the patient was returned to her room she expressed herself as feeling fine and said nothing hurt her.

Case 4.—The fourth case was seen last week. I was called in consultation to see a woman weighing two hundred and sixty-five pounds in labor. She was thirty-nine years of age, and this was her first baby. The attending physician said he thought we had better call some one to administer the anesthetic, because we would probably need to help each other before the delivery was completed. Another doctor was accordingly asked to administer gas. This was started when sufficient cervical dilatation had been obtained, but he later changed to ether. I did not notice when the change was made, nor am I aware of his reason for so doing. The presentation was L. O. A., but it was one of the most difficult and tedious labors I have ever known. No progress could be made, and forceps were placed upon the head after some delay. The other physician and myself worked for several hours, until we were practically exhausted, before finally completing the delivery. Several doses of pituitrin $\frac{1}{2}$ Cc.

each were administered but seemed to have little effect. Gas acted nicely in the beginning of this case, and why the physician changed to ether I do not know.

When nitrous oxide gas was first recommended in labor, a friend of mine suggested that I procure a portable apparatus to be added to my obstetrical outfit and administer the gas myself or have a nurse do so, but I declined, as I did not propose to be anesthetist and obstetrician in the same case. A man has all he can do to attend to one end, and some one else should be delegated to attend the other. I do not want anybody to give gas for me excepting an experienced anesthetist, as I would not feel safe otherwise.

I can see absolutely no danger in the use of nitrous oxide gas in obstetrics. I do not see how it can possibly injure the mother or the baby if the anesthetist understands his business. Of course, if too much gas is given, to the exclusion of oxygen, the patient may be overcome, and this might have some deleterious effect upon the baby; but if a man understands his apparatus and knows how to administer the gas in proper proportion with oxygen, there is no excuse for the patient being overcome.

In nitrous oxide gas and oxygen I believe we have almost a perfect method for inducing analgesia and anesthesia in labor cases. In my opinion, however, the time is coming when hypnotism will be extensively used in obstetrical work. I have thought for many years that we should have a law governing hypnotism so framed that no one could use it excepting the duly qualified physician. If we could get the confidence of the people in the use of hypnotism, I believe we could place the woman under certain environments so she could be safely and satisfactorily delivered under this method. A large element of hypnotism enters into the so-called twilight sleep as practiced under the Freiberg plan. I believe we could place the woman in a darkened room or blindfold her, and with the proper method of suggestion I can see no reason why hypnotism would not act just as well as any anesthetic. In hospital deliveries where I had the perfect confidence of the patient, I have often thought

of trying hypnotism, and believe it would be successful.

Until the time arrives when women can be delivered under hypnotic influence, nitrous oxide gas is undoubtedly the safest and best method of inducing analgesia and anesthesia, but it will not be generally used until some plan is devised to reduce the cost to a more reasonable basis. Gas is an ideal anesthetic in obstetrical work, labor is not retarded by its administration, and the patient feels well and strong after the ordeal is over.

In closing I desire to say a few words about the administration of pituitrin. I have not had any unfavorable results from pituitrin in private practice. When this drug was placed upon the market I told the representative of the manufacturers that it was calculated to do more harm than good, that the dosage recommended was entirely too large, and that I believed rupture of the uterus might be produced by the powerful muscular contractions thus induced. Three years ago, during my service at the Louisville Public Hospital, the interne asked me one morning to examine a patient who had a ruptured cervix. He stated that the woman had been admitted to the hospital for delivery, and several doses of pituitrin had been administered the night before. The cervix was about half dilated at the time, and the result was that an extensive rupture had occurred. I immediately interviewed the superintendent of the hospital, and instructed that pituitrin be discontinued excepting when it could be administered under the personal supervision of the attending obstetrician.

Since that time the manufacturers have changed the style of their container, reducing the dosage one-half—i.e., from 1 Cc. to $\frac{1}{2}$ Cc. I have never administered more than $\frac{1}{2}$ Cc. at a dose, but have repeated it every thirty minutes where necessary until four doses had been given. I have never seen any unfavorable effect from it when administered in that way. I never give it until the cervix is thoroughly dilated. Where the pelvic conformation is normal there should be no bad results from pituitrin properly used.

NITROUS OXIDE ANALGESIA AND ANESTHESIA IN OBSTETRICS.¹

BY W. HAMILTON LONG, M.D.,

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The subject I have chosen for presentation to you to-night is one which, as you know, has aroused as much interest as any other in the domain of medical practice during the last few years. In the short time which has elapsed since nitrous oxide gas was first used to any extent in obstetrics, the literature has become voluminous and is almost universally favorable to the method.

The popular propaganda for "twilight sleep" which was conducted three or four years ago in the secular magazines so wrought up the womanhood of this country as to create on their part a demand for the so-called painless childbirth. The subject was handled in the lay press with that spectacular glamour and cocksureness, that fantastic style characteristic of magazine writers, and most of the articles so enthusiastically lauded the Freiberg morphine-scopolamine technique, that the physician was forced to meet the demands of his maternity-approaching clientele who had absorbed the magazine campaign at its apparent rather than its true value.

These worthy women had obtained the impression that all pain and discomfort incident to lying-in was now by a miracle rendered entirely unnecessary, and that the doctor who did not administer twilight sleep was distinctly behind the times, and unprogressive if not ignorant. As a matter of fact, however, he was carefully weighing the advantages against the disadvantages, the safety against the dangers, the wisdom of his past experience against the folly of rushing in with a hypodermic syringe and administering several doses of morphine and scopolamine to women in labor based upon nothing more scientific than a layman's article in a fifteen-cent magazine! In other words, he was wisely applying the national slogan, "Safety first."

It is not the object of this paper to make a comparison between the so-called twilight sleep and the method of nitrous oxide gas

analgesia. It is due to the wide prominence given the former that the latter, being developed gradually without the ringing of bells and the blare of trumpets, has reached its present popularity and perfection of technique. It occurred to many obstetricians and anesthetists, especially the latter, who were familiar with nitrous oxide and realized its ideal properties as an analgesic and light anesthetic, that if a "Dämmer-schlaf," "Twilight sleep," or "Sunrise slumber" were feasible and practicable, this agent (nitrous oxide) with its known safety in the hands of one accustomed to its use more nearly approached the ideal in its action than any other.

The modern woman, especially the city woman, is a creature of abnormal and unnatural nervous development. The artificial civilization—and all civilization is artificial—of which she is both the product and the cause, has made a function which should be purely physiological partly pathological. Her high-tension life, her environment, her mode of living, her manner of dress, and for many generations her heredity, have robbed her of that nervous and physical stamina with which the savage woman, the European peasant woman, and the simple-living country woman meet the ordeal of child-bearing.

Certainly we owe to such a woman in labor all that with perfect safety may be done to alleviate her suffering, both mental and physical, and if the popular hysteria anent twilight sleep awakened us to our duty, let us be thankful although ashamed. As has been said, the civilization that produced the demand should through its scientific achievements be able to adequately meet it. I believe our first duty to the prospective mother is to guard her life through the ordeal together with its convalescence and approach; second in importance is to guard the life of the child; third, but not in the least at the expense of the foregoing two, to render the period of labor

¹Read before the Louisville Medical Club, of Louisville, Kentucky, Oct. 20, 1916.

as free from pain and discomfort as may be. And in nitrous oxide gas properly used we have that agent most nearly approaching the ideal for this purpose.

Safety.—Nitrous oxide gas properly diluted with oxygen, either pure or from the atmospheric air, is safer by far than any other agent approaching it in efficiency by whatever method of administration. It was at first thought danger to the unborn child was considerable through oxygen starvation, but it is now known that such danger can exist only through unskilled administration. To the mother it is the safest agent that can be given by any method. It is always under perfect control, and is eliminated immediately upon its withdrawal. Such, of course, is not true of any drug administered hypodermically, nor to the same extent with ether or chloroform, and the latter agents may cause later complications of the kidney, lung, or liver. Nitrous oxide is without any secondary effects, being eliminated entirely by the lungs, and that immediately.

Efficiency.—Nitrous oxide gas is an ideal analgesic and light anesthetic. A condition of general analgesia can be maintained as such indefinitely and merged into complete anesthesia at will. It may be pertinent to remark that analgesia is defined as a condition in which the individual is insensible to pain, yet the sense of touch persists and consciousness remains practically normal. Anesthesia, on the other hand, signifies entire loss of consciousness, of course including perception and tactile sensibility. While nitrous oxide gas may have many shortcomings as an anesthetic for routine application in surgery, its properties and action are particularly adapted to obstetrical practice.

General Applicability.—There are no contraindications, in the usual sense of the word, to the use of nitrous oxide in labor. There will be found individual cases in which its action may not be ideal and in which we will be disappointed. These disappointing cases are usually found in certain nervous types of women, such as one of the three specimen cases to be herein

reported. In such patients ideal analgesia is not achieved, although amnesia is usually observed, and anesthesia if necessary can be easily induced and maintained.

General Advantages.—First, safety, as has already been noted; second, there is no interference with the strength, duration, and frequency of the uterine contractions; third, the vitality of the patient is conserved. The labor pains are more effective for the very obvious reason that the patient is in an analgesic state, and hence conscious and responsive, and will the better aid herself in her voluntary bearing-down efforts; *i.e.*, she will work harder if her increased efforts cause her no pain. Light anesthesia where necessary may be maintained for an indefinite period, and the uterine contractions will appear at normal intervals and apparently with normal force. This, of course, is due to the nicety with which a true although very light anesthesia—*i.e.*, with unconsciousness—can be maintained, and is an advantage not possessed by chloroform or ether. There is usually amnesia, and although the patient may complain more than was expected, and the attendant and the anesthetist may feel chagrined at their results, it will be found afterward that there is little memory of pain. The patient, after completion of the delivery and recovery, will have but a vague subconscious memory of pain. As one of my patients described it, "like a dream of being in pain, and awakening to the delightful realization that it was just a dream."

Disadvantages.—The only disadvantage of this method is that of the expense. Unfortunately nitrous oxide may never come into the general use which it deserves because the average patient in labor cannot afford to pay the additional expense of the gas and the services of one capable of properly administering it. In most large cities, however, an increasing number of women are going to hospitals for their lying-in, and in most large modern hospitals gas is furnished, as is also some one trained in its use. It is therefore in hospitals that the most of this work has been done. Some hospitals with large endowments are fur-

nishing a "Sunrise slumber" delivery to their indigent patients as a matter of course. The method, however, is just as well adapted for use in the private residence, as no especial and elaborate surroundings are necessary, nor is any psychic effect sought.

Technique.—The technique of the administration of nitrous oxide gas in labor varies only as to the question of the diluent, or rather the source of the diluent. For the sake of economy and more ready portability, atmospheric air may be the source of the oxygen, although the pure oxygen is undoubtedly the better. Personally I much prefer the latter, and feel safer with a tank at hand immediately to dissipate any cyanosis which may occur. No cyanosis should at any time be permitted, and the mixture should be sufficiently rich in oxygen to preclude it. Cyanosis can be prevented by proper administration.

In maintaining nitrous oxide gas and oxygen anesthesia continuously for surgical work, it may be found necessary at times so to concentrate the gas that a slight duskiness may be present, but for analgesia and the usually light anesthesia in obstetrical work this is not only unnecessary but dangerous, and indicates faulty administration. Following is very briefly the technique usually employed in obstetrics and which I have found satisfactory.

Any apparatus with which the anesthetist is familiar may be employed. Generally speaking the simpler, smaller and lighter the machine the better for this purpose in private work, because of easy portability. The administration may be begun whenever the pains become prolonged and severe to the extent that the patient asks for relief. Most obstetricians prefer to have their patients "up and about" during most of the first stage, and the pains during this stage are borne with little complaint. About the latter part of the first stage, when dilatation is nearly complete and when the patient goes to bed to remain, the gas is usually started. The patient is instructed to notify us at the beginning of each contraction, and the mask is immediately placed over the face, the bag of the apparatus having previously been filled. She is instructed to

take two or three full, deep breaths of the gas, "then hold and bear down." This is repeated when the breath can be held no longer, with the mask continuously in place, and the gas gently flowing, until the pain subsides. With a correct mixture the patient has not been unconscious, nor at any time incapable of responding to suggestions and instructions rather loudly and briskly spoken. This is repeated with each pain, assuming of course that the labor be normal, until toward the last, when the head is on the perineum and the pains so long and severe as to be practically continuous, the analgesia is merged into a light anesthesia and the patient so held until delivery is accomplished. The gas is then withdrawn, but may later be again exhibited for delivery of the placenta and for perineal repair should repair be necessary. And it may be here stated that the number of lacerations will be reduced appreciably by this method. For forceps application, version, or any operative procedure, of course continuous anesthesia is usually necessary, and anesthesia of sufficient depth can almost invariably be achieved without the addition of any other agent to the gas.

A few words may be permitted about who should administer nitrous oxide gas. I believe good results in obstetrical work will not be secured unless the gas administration is in the hands of some one accustomed to its use. Its efficiency and its safety depend entirely upon (a) the skill with which it is administered, and (b) upon a thorough knowledge of its action. The main point to be observed is the diluent. Whether the necessary oxygen be taken with the atmospheric air, in which event thirty to fifty per cent will be sufficient for analgesia, or whether pure oxygen be used, the mixture must be closely watched and the proportions varied according to the conditions from time to time.

It is not easy to keep the proportions just right when changes must be constantly made, and the margin of satisfactory working anesthesia and analgesia is narrow. On the one side are cyanosis, even jactitation and rigidity, with their dangers to the unborn child, and on the other an insufficient

degree of analgesia for pain-relieving effect. Gas is easy to administer in obstetrical work—if one know how; but gas more than any other agent used in anesthesia requires experience and skill both for safety and efficiency.

Three specimen cases from my records will be reported. I first administered nitrous oxide gas for analgesia in obstetrics two years ago in a series of cases at the Louisville Public Hospital.

Case 1.—Mrs. W. L., second delivery. This was an ordinary case of normal labor. Gas was begun before the first stage was quite complete. Labor was brisk from the start, there elapsing only four and a half hours from onset to termination. The second stage lasted about one and a half hours. The technique described in the foregoing was used, analgesia until the last twenty minutes, then light anesthesia for completion of the labor. A slight perineal tear was repaired and the placenta delivered under light anesthesia. This patient, as have all others who had previously borne a child or two without nitrous oxide gas, was enthusiastic in her praise of the method. The comparison of delivery with nitrous oxide with other methods is always markedly in favor of the gas.

Case 2.—Mrs. R., second delivery. This patient's physician consulted me as to the nitrous oxide analgesia some time in advance of the labor because of her fear, nervousness, and apprehension; also because of a persistent albuminuria for two or three months, as well as a nervous, irritable heart action, which was constantly from 100 to 130, almost never falling below the first figure. Her first delivery had been with a modified Freiberg technique which had been unsatisfactory to the attendant and was remembered with terror by herself. Gas was started at about the beginning of the second stage. After a few inhalations she invariably developed delirium and evidence of intoxication, and throughout the pain had to be restrained. However, she had an almost complete amnesia, and as we did not wish to change the method for the reasons already stated, we continued with gas, for which she begged as a pain appeared. After

three or four hours, during which time every attempt to secure smooth analgesia was marred by the hysteria and delirium, and because of her insistence and the rapid heart action, the gas was concentrated, complete anesthesia was induced, and the patient delivered with forceps within thirty minutes. This case was unsatisfactory to us, but because of the amnesia was very satisfactory to the patient. There was no laceration. On account of the delirium and intoxication it was impossible to induce smooth analgesia, but by administering concentrated gas, reducing the oxygen, uniform anesthesia was obtained for completion of delivery. The patient later stated that the method was quite ideal from her viewpoint, because she had practically complete loss of memory concerning the labor. She has but a vague recollection of what happened, as though it were some one else than herself.

Case 3.—Mrs. J. R., primipara. Gas was started at the beginning of the second stage, the membranes having ruptured and the patient having gone to bed to remain. In this case the presentation was a right occipitoposterior. The pains were of normal duration and frequency. Following the technique described the pains were dulled by an ideal analgesia, from which at the termination of each pain she emerged smiling. This was continued three hours, when the progress not being satisfactory to the attending obstetrician forceps were applied. This was done under analgesia, and continuous analgesia (not anesthesia) was maintained until delivery was completed. Traction was made coincident with contractions only, and the head was delivered just as would have occurred normally.

It is important to remember that with the administration of nitrous oxide gas the strength of the patient is conserved to a marked degree. I nearly always induce complete anesthesia by the continuous inhalation method for forceps application, and continue the anesthesia until the delivery is completed. In the last case mentioned the patient was aware that forceps were being applied and that traction was being made, but said afterward that she did

not feel any pain. She was conscious and able to converse with us during the entire time. There was no laceration, and the method was eminently satisfactory to both patient and obstetrician.

I have never noted any ill effect whatsoever upon the child from the administration of nitrous oxide gas to the mother. The babies are usually born fairly pink in color; they cry promptly without any more artificial manipulation than children born under chloroform or ether anesthesia. A great many babies, where the mother is given any anesthesia, or no anesthesia, are slightly cyanosed for a few minutes. I have never seen a child born under nitrous oxide gas analgesia where there was the least trouble in resuscitation.

It was formerly thought chloroform was almost without danger in obstetrical practice, although its dangers were freely admitted in surgery. There seems no logical reason why chloroform administered for one purpose should lack certain dangers which are apparent when given under other circumstances, excepting that the quantity administered is usually smaller in labor than for the purpose of a surgical operation. Not only the primary but the secondary dangers of chloroform have been fully recognized during the last few years. Many deaths have undoubtedly occurred from the administration of chloroform in both surgery and obstetrics a week or more afterward, from degenerative liver processes, etc., where dissolution was attributed to other vague causes.

Another important feature is that chloroform is usually less pleasant to take and analgesia cannot be maintained as with gas. Nausea and vomiting are seldom noted following gas administrations. When chloroform is given in labor the uterine musculature is paralyzed and contraction prevented, thus defeating the object sought to be accomplished. There is total loss of consciousness and uterine contractions cease under chloroform anesthesia, whereas with gas the uterus contracts normally just as though the patient were fully awake. In this way the obstetrician can make traction with his forceps at exactly the proper

time—*i.e.*, with pains—and labor is facilitated instead of retarded.

Of course I am quite well aware that chloroform is not considered dangerous in labor, that it has been used in millions of cases, and that its use will continue; but nitrous oxide gas, because of its manifold advantages, because of our ability to maintain analgesia for an indefinite period, because analgesia may be safely merged into light anesthesia when required, because it does not interfere with uterine contractions, marks its superiority over every other known method of inducing analgesia and anesthesia in obstetrical practice.

In this section of the country we have always been chloroform advocates. It was discontinued in surgery only after its dangers had been emphasized by the experience of operators in the north and east, and it is now being discontinued in obstetrics and ether substituted where for any reason gas cannot be used. In the east chloroform is rarely administered in obstetrics, and where gas is not obtainable ether is employed. It was formerly believed ether was especially treacherous in its action upon the kidney, whereas chloroform was not. I now give ether without hesitation to elderly patients with ordinary interstitial nephritis, and have never noted any deleterious effects, such as increase in the renal involvement, death from uremia, etc.

The observation is important that nitrous oxide gas conserves the strength of the woman in labor, and she emerges from its influence stronger and fresher than before the gas was started. Pituitrin, as is well known, produces powerful uterine contractions, and nitrous oxide works admirably in conjunction with that drug. Analgesia can be maintained indefinitely, where the pain induced by pituitrin may be so long and severe that it is practically continuous.

No attempt has been made in this paper to classify and enumerate the methods of gas administration. These may be found in detail in the article by Guedel in the American Year Book of Analgesia and Anesthesia, and also in current medical literature. My method in ordinary labor, as already indicated, is the individual pain

application for the induction of analgesia. As soon as the pain ceases the gas is withdrawn, and the patient becomes completely conscious within a few seconds. The gas is not again exhibited until the next pain begins. Its safety lies in the fact that it is eliminated immediately and solely by the lungs. It has no circulatory effect, it places no extra strain nor tax upon the kidney, the skin, nor any other emunctory. Given to deep anesthesia the patient will return to complete consciousness within three or four minutes, and frequently in less time than that.

I have not observed any nausea or vomiting that could reasonably be attributed to the administration of gas. Patients are occasionally nauseated during labor without analgesia. I am sure gas in the proportions in which I have been in the habit of giving it—i.e., rich with oxygen—does not cause nor increase the tendency to nausea and vomiting.

The danger of unskilled administration consists principally in the lack of appreciation of the nicety in the admixture of gas and oxygen. The greatest danger is in allowing the gas to predominate to such an extent that cyanosis is produced. It is certainly dangerous to the unborn child if the mother is allowed to become cyanotic and remain so for any considerable length of time.

The administration of gas with success and satisfaction necessitates familiarity with the apparatus used, which is now so adjusted that it is a rather delicate piece of mechanism. The patient must be closely watched, because the line of demarcation between analgesia and anesthesia is very narrow, and the safety of either depends to a large extent upon the care with which the gas is administered. With the proper admixture of gas and oxygen the effect is ideal; on the other hand, if the gas is too concentrated—i.e., if an insufficient amount of oxygen is allowed—cyanosis, rigidity, and jactitation may ensue with their attending dangers.

In closing permit me to say that the minute details in connection with gas ad-

ministration can only be acquired through practical experience, and to be successful the anesthetist must be educated in that particular line of work. I had administered nitrous oxide gas as a preliminary to ether for the induction of anesthesia in surgery many years before its use was begun in obstetrics.

Finally, not all individuals take any form of anesthetic exactly alike, and careful study is required in every case. Gas is exceedingly disagreeable to certain people, and the same statement is equally applicable to chloroform and ether.

WEISSINGER-GAULBERT BLDG.

CONTINUOUS COUNTER-IRRITATION AS A THERAPEUTIC MEASURE IN RHEUMATOID ARTHRITIS, ETC.

MIDELTON in the *Practitioner* for October, 1916, says that the most fashionable method of treating arthritis at the present time is by means of vaccines. Several years ago he crystallized his opinion of these as follows: "Brilliant at times, uncertain for the most part, not without danger." He has not yet altered his opinion. He is under the impression that it is particularly difficult to influence organic changes in the cord by means of vaccines, even when the changes are merely in the congestive or slight inflammatory stage.

He is convinced that Dr. J. K. Mitchell, Sr., and Dr. Latham demonstrated that it is possible to influence such changes beneficially by means of continuous counter-irritation, and his own results based on this belief are of the most encouraging character. Not only are changes in the spinal cord beneficially influenced, but the whole system improves when continuous counter-irritation is properly carried out for a sufficient period.

Amongst other improvements, he has noted the following in a sufficiently large number of cases to be beyond any possible question of their being mere coincidences:

Pain and swelling have gone from joints, and movement has greatly increased.

Wasted and contracted muscles have

thickened, elongated, and become more powerful.

Pads and fringes in the interior of joints have so diminished as no longer to cause pain or limitation of movement.

Fibrous and semifibrous thickenings of all kinds, such as adhesions, nodules, and lipomata, have disappeared; in some cases the nodules have been as hard to the touch as wood.

Deformities of arms, legs, toes, and fingers have greatly lessened. For instance, in several cases of so-called pes cavus, in which the toes have become rigid and immovable, even when the condition has existed for years, movement has been restored, and pain and weakness in the leg and foot have, for all practical purposes, gone. Thickening of the skin and subcutaneous tissue, in some instances amounting to scleroderma, have been overcome and the skin made supple.

Legs that have looked like bladders of lard have assumed a normal shape and color with the veins clearly seen.

Eruptions of many kinds on the skin, as well as discolorations, have cleared up. In one instance a patient had psoriasis from head to foot, and the skin all over the body was harsh and sallow. After a course of continuous counter-irritation the psoriasis completely disappeared, and the skin became white and supple. Thyroid extract had been previously administered without much benefit, even when pushed to large doses.

"Wooden" facial features have become normal.

Sleep, appetite, digestion, and action of the bowels have greatly improved, and so have sight, hearing, taste, and smell. In one instance a patient of fifty-five years of age was able to discard her spectacles, and to sew and read without them. In another a patient who had suffered from polyarthrititis and all that goes with it for over twenty years, and who had become bedridden and helpless, resumed lace work and embroidery after having given it up for years through loss of power in the fingers and arms.

The mental capacity, too, greatly increases, and morbid thoughts of all kinds either diminish or go completely.

Skilfully and carefully carried out, the treatment is without serious risk, and sepsis plays no part in it. Midelton seldom finds leeches or cupping of any advantage.

The three methods he employs are:

1. The blister, followed by savin ointment.

2. Multiple superficial acupuncture (thousands of punctures are made at each sitting), followed by irritants. He paints over the punctured area a mixture of croton oil, cantharides, and almond oil. The mixture is carefully proportioned in order to produce an eruption only and no blisters.

3. The galvanocautery. This is chiefly applied to the back near the spine. Small dots or dashes are made, the number being arbitrary and given according to the needs of each patient.

It has been argued by some that these methods are too drastic, that the cure is worse than the disease, and other nonsense unworthy of thoughtful, scientific men. Properly carried out, these measures entail very little suffering—certainly nothing like that endured by patients after most surgical operations. The agony Midelton personally went through for two whole nights after an operation for appendicitis will remain as a terrible memory as long as he lives, especially as nothing was done for his relief beyond a turpentine enema.

When peeling off the blister, and during the first two or three applications of savin ointment, he gives sufficient chloroform to deaden the smarting, and he has never had any cause to regret it. He has no hesitation in giving opium in some form, as a mixture of tincture of opium and hyoscyamus.

No patient is too feeble for one or other of the methods. In very feeble cases he applies the multiple acupuncture for a time, and later on the blister and savin, if necessary.

[We hope all this is correct, but we fear that the author is unduly enthusiastic.—Ed.]

EDITORIAL.

THE BEARING OF MYOCARDIAL EFFICIENCY UPON TREATMENT.

One of the most important lessons to be learned by the medical student is the fact that the existence of a cardiac murmur does not indicate the administration of digitalis or other cardiac stimulant. On the contrary, in some instances, the presence of a murmur depending upon disease of a valve indicates that the heart muscle has undergone compensatory hypertrophy and is pumping strongly enough to make a murmur. This is well illustrated by those cases without a murmur presenting symptoms of ruptured compensation in which after rest and the proper administration of digitalis a distinctly audible murmur develops. In other words, while it may be important that the physician recognize that a valvular lesion exists, it is much more important that he obtain some conception of the strength of the heart muscle.

Until within a few years the nearest approach that we had to such an estimation was by listening to the first sound of the heart to discover if it possessed a normal tone, and also by palpation to determine if it had a normal thrust and if the apex beat was in the normal position. The introduction of the sphygmomanometer has, however, provided us with much more accurate measures by which the state of the heart muscle can be determined. Entirely apart from the fact that it reveals a poor circulation in certain cases, which might have been determined by the fingers of the trained physician, it gives us the means of deciding upon the difference between the diastolic and systolic pressure and so affords a fairly accurate index of the strength of each individual beat. If used in the proper manner, moreover, the sphygmomanometer is capable of giving us additional information of the greatest possible value, not so much in those who are bedridden because of the presence of some acute malady, but in walking cases that come to the physician be-

cause of certain symptoms which lead them to believe that all is not well.

In persons who are fortunate enough to have a healthy heart muscle only very excessive circulatory strain can produce much effect, and such effect passes away in the course of a very few minutes, so that within a remarkably short time after violent exercise the condition of the circulation is identical with its state before the stress was experienced. For this reason many physicians during the past few years have been in the habit of estimating the blood-pressure before and after exercise and have thereby been enabled to determine whether cardiac treatment was necessary, what dose of a given stimulant was required, and, equally important, how long the treatment should be continued.

In this connection we wish to call attention to an important article contributed to the *British Medical Journal* of October 14, 1916, by Goodall, who is Assistant Physician to the National Hospital for Diseases of the Heart, in London, and whose position as Lecturer on Physiology at the Middlesex Hospital enables him to combine physiological investigation with clinical observation. He well points out that many hearts which work perfectly to all intents and purposes when the individual is at rest, nevertheless exhibit serious derangement and reveal definite evidence of myocardial impairment when called upon to do extra work under load. In some instances such defects are revealed by the development of irregularities or murmurs, or by the onset of dyspnea in place of normally increased respirations. If an individual with a perfectly healthy heart, and young in years, undertakes a task which requires great endeavor on the part of his circulatory system, there is a definite increase in the pulse-rate, in blood-pressure, and in the number of respirations per minute, and a fairly definite relationship is maintained between the pulse-rate and respiration. Goodall finds that it is rare, in healthy people, to be able

to raise the heart-beat above 180 a minute excepting by the most violent forms of exercise, and he has made the interesting observation that such violent exercise in the healthy young adult may induce a systolic pressure as high as 220 millimeters of mercury. When the exercise ceases the pulse-rate, blood-pressure, and respirations fall rapidly, the blood-pressure usually reaching normal before the pulse-rate, and the respirations becoming normal as to speed before either of the other functions. In those who have been subjected to athletic training it has been found that the increase in blood-pressure and pulse-rate occurs almost immediately, instead of gradually as in the ordinary individual, apparently because the circulatory system has been trained to respond instantly to the increased demands of the body. In the diseased heart, however, there is a tendency for dilatation to occur quite early under stress, with the result that there may be a great increase in pulse frequency, but the blood-pressure either falls or at least fails to rise as it normally should do, breathlessness is abnormally urgent, and the normal pulse-respiration ratio is disturbed. If the exercise is persisted in irregularities of the pulse, such as extra-systoles, auricular fibrillation, alternations, murmurs, or pulsations, not previously present, make their appearance. Goodall is one of those who believe that extra-systoles are not of little importance, but that the development of them on exertion always indicates a damaged myocardium.

In view of these facts a number of interesting and important tests with valuable results may be instituted. The patient is weighed and the number of pounds recorded; he is then made to lie down on a couch, and his pulse-rate, systolic blood-pressure, and respirations are also recorded. He then is subjected to a known amount of muscular exercise. Usually he is made to climb stairs to the height of twenty feet in the space of thirty seconds. The work done is usually obtained in foot pounds by multiplying the body weight in pounds by the number of feet the body has been raised. Immediately his pulse, blood-pressure, and respirations are taken a second time and

carefully recorded. If he has a good reaction, the pulse-rate, blood-pressure, and respiration should be normal at the end of three minutes after the exercise is taken, or, in other words, the number of pulse-beats, the pressure and the respirations should be identical with the number per minute before the test. Such results indicate a perfectly healthy heart muscle. Fair reactions are those in which the pulse-rate of 72 becomes one of 88 after exercise; a pressure of 120 becomes 130 after exercise; and a respiration rate of 18 becomes 24 after exercise. Three minutes later the pulse is 80, the pressure 124, and the respiration 20. In other words, all these factors have not returned to their primary level in three minutes, but have approximately done so. A bad reaction is one in which the blood-pressure fails to rise, although the pulse and respirations go up, and a very bad reaction is one in which the pulse and respirations greatly increase, although the blood-pressure actually falls and both blood-pressure and respiration are as high or higher after three minutes' rest as they were before exercise. Fair reactions are usually met with in normal persons who are not accustomed to physical exercise, but bad and very bad reactions are typical of heart muscles which have been actually damaged.

In certain instances before reaching accurate results it may be necessary to subject the patient to a more severe test than the twenty-foot climb in thirty seconds. Goodall thinks that in a healthy youth it ought to be possible for him to do 30,000 foot pounds of work in nine minutes and to be normal again within fifteen minutes. While it is true that exercise sufficiently violent to induce this amount of work may produce a murmur or diminution of the pulmonary second sound, a pulmonary systolic murmur, epigastric pulsation, or tricuspid murmur, such conditions are fleeting if the heart is normal, but these should not be associated with a definite fall in pressure, although, after thirty years of age, such a fall would not be indicative of disease. It is, therefore, questionable if after this age a patient should be subjected to such violent tests.

It is interesting to note in this connection that several decades ago Oertel, and many others who followed him, found that he could distinctly increase the tone and ability of weak heart muscles, in a certain proportion of cases, by methods of physical exercise begun gradually and gently increased in severity, week by week and month by month, until a heart quite incapable of doing ordinary work was able to stand severe hill climbing. In other words, Oertel's method was based upon what we know of the results of exercise upon the voluntary muscles, namely, that by this means they can be given increased power.

It is manifest, of course, in heart muscles which have undergone actual degeneration, as a result of some chronic or acute infectious process, that it is always a question as to how much healthy muscle still remains and how much work this healthy muscle can accomplish, and, again, how much it can be improved in its ability to do work by training. Nevertheless, it is the function of the physician to attempt to get at least as near a correct estimation of his patient's actual cardiac state as is possible by the aid of instruments of precision. In some cases the use of these tests would indicate that rest is the most essential factor in producing betterment; in others, rest, followed in a few days by the use of proper doses of digitalis and nux vomica, will be the treatment required; and in still others no medicines may be needed, but in their place graduated exercises will, in time, bring about an improvement in the heart muscle which is essential for the maintenance of a normal circulation at rest or in the face of muscular and cerebral endeavor.

ACETONURIA AND THE QUESTION OF TREATMENT.

Some months ago we called attention to a series of investigations made by Howland and Marriott and others, in regard to so-called acidosis and its development in the summer diarrheas of infancy and nearly related conditions. Readers of the GAZETTE will, therefore, be interested in a recent

contribution by Howland and Marriott in which they point out certain facts fairly well recognized by workers in this field, but not as generally recognized as they should be. In the first place it is to be clearly understood that there is a great difference between acidosis, so-called, and acetonuria. An acetonuria of a varying degree is probably present in a great number of cases that present no symptoms whatever of illness, and the presence of acetone in the urine, even if it be in large amount and, therefore, indicating that there is some disorder of metabolism, does not necessarily indicate acidosis, but rather that the body has been able by oxidation to change beta-oxybutyric acid into diacetic acid and diacetic acid into acetone, thereby converting two poisonous substances into a harmless one. Of course, a very marked acetonuria may be suggestive of acidosis in the sense that the physician may believe that all of the beta-oxybutyric acid has not been oxidized, but it must be recalled that the body possesses the additional power, over and above that of oxidation, of neutralizing a certain amount of these acids by the use of its alkalies, thereby rendering them innocuous.

We are dealing with this subject because we fear that at the present time a wave of enthusiasm in regard to acidosis, so-called, is sweeping over the profession in much the same way that the uric acid proposition was swallowed, hook, bait and all, some years ago, and having been swallowed has neither been digested nor gotten rid of, but remains as an erroneous factor in the minds of many men. It is important to remember, therefore, that a diagnosis of acidosis cannot be made by a qualitative examination of the urine. In other words, in addition to the discovery of acetone by qualitative methods we must observe hurried or labored breathing and mental stupor as evidences of the action of these poisonous substances. The therapeutic lesson to be learned is that we should not be too ready to administer sodium bicarbonate by the mouth and rectum in large quantities unless we have adequate reasons for believing that the oxidation processes of the body are impaired, that the normal alkalies are being

unduly used up, and that the powers of elimination are not what they should be. Nor should alkalies be freely given when there is danger of disordering the digestive function, if it is possible, in those cases of acidosis which depend upon inanition, to correct it by the use of easily assimilated carbohydrates, such as predigested starches or levulose.

RENAL TESTS, PROGNOSIS, AND THERAPY.

It is rapidly coming to be generally understood that most of the methods which have been employed in the past in reaching a diagnosis as to the condition of the kidneys have either been crude in themselves or have failed to give us a correct conception of the pathological processes which were present. While it is true, in general terms, that a healthy kidney does not permit albumin to appear in the urine, and still more emphatically true that a healthy kidney does not give rise to any considerable number of casts, nevertheless the presence of albumin and casts in the urine may be considered, in the light of our present knowledge, as rather gross symptoms, present only when there is a considerable degree of disease, and possibly only when certain portions, or functions, of the kidney are impaired.

Many years ago attempts were made to determine the functional ability of the kidney by the hypodermic injection of methylene blue and indigo carmine, but it was found that these tests were so uncertain in their results and so often misled the practitioner in his conclusions that they have practically passed out of use. In their place the phenolsulphonephthalein test is found to-day largely employed by medical men and surgeons, and yet it is becoming increasingly evident that while this test of the function of the kidneys is sufficiently valuable to be employed in many instances, in many others it fails to give the investigator the information that he needs for various reasons, some of which are not as yet clearly understood, but probably because

certain parts of the kidneys may be active while other parts are inactive. In other words, it would seem to be becoming increasingly evident that too much faith should not be placed upon any one test of renal efficiency. It is as if the physician found that the digestive apparatus of his patient could not deal with a single article of diet, and therefore jumped to the conclusion that the alimentary apparatus was not fit to deal with any article of diet, and, so, we find that for the careful and exact study of renal disease it is essential to consider more than one of the activities of these important glands and in many instances, in addition, to study the condition of the blood which reveals the retention in it of substances normally present in very small amounts, but present in comparatively large quantities when certain portions of the kidney are impaired. In some cases the chlorides of the urine are diminished because of kidney inefficiency; in other instances the amount of urea is materially reduced, but in these cases the scant quantity of urea, unless the estimation is controlled by blood examination as well, seems to be of little diagnostic value unless the blood be examined for retained nitrogen. With the importance of an estimation of the so-called non-protein nitrogen of the blood in connection with a protein diet in the presence of chronic nephritis we have already dealt in a recent issue of the GAZETTE.

Recent summarizations as to the functional efficiency of the kidney give us much clinical information of value. It seems to be evident that in very important and urgent cases the blood should be examined for the determination of its uric acid content, urea, creatinin, and sugar, since, in some instances, there may be an excess of sugar in the blood, which because of renal disease does not appear in the urine as it would in the ordinary case. Clinical investigation reveals the fact that there may be a high uric acid retention without the retention of other substances. Uric acid retention may occur as a very early manifestation of kidney trouble, whereas the retention of creatinin often occurs only when disease is fairly well advanced; or to put it differ-

ently, as well expressed by Chase and Myers, creatinin is most readily eliminated and uric acid is least readily eliminated by the kidneys, and therefore if the creatinin in the blood is increased the kidneys must be considerably impaired. For these reasons the prognostic value of the discovery of creatinin retention may be very great, and Chase and Myers think this retention more important than the phenolsulphone-phthalein test, since there may be creatinin retention in the presence of prompt excretion of the coloring matter just named. The amount of creatinin to 100 Cc. of blood which is to be regarded as having an evil omen is any quantity which exceeds five milligrammes.

Concerning the quantity of non-protein nitrogen, it will be recalled that any quantity in excess of approximately 30 milligrammes per 100 Cc. of blood is indicative of trouble, and if the milligramme percentage rises as high as 50 or 60, grave trouble is to be anticipated, while higher percentages indicate a mortal result. Thus Mosenthal and Lewis point out that when the non-protein nitrogen was above 90 milligrammes fourteen patients soon died out of eighteen cases studied.

Lastly, a method of testing renal efficiency, which is open to every practitioner, even if he has not the time and facilities for laboratory investigation, is to be mentioned, the so-called "meal test." The patient is kept on his ordinary diet and is allowed no food or liquid except that taken at meal-times. The first urine is collected three hours after the evening meal, and it has been found that under these circumstances the nocturnal urine yields a maximum specific gravity of 1.018 when not more than 400 Cc. are passed at night, and the specific gravity of the urine passed during the succeeding day, taken every two hours, does not fall in specific gravity below 1.009. The passage of large quantities of urine at night in excess of 400 Cc., with a constant lowering of both nocturnal and diurnal specific gravity, indicates inability on the part of the kidneys to perform their work as they should.

In other words, the time is approaching,

apparently, when it is the duty of the physician not to be content alone with a determination that the kidneys are diseased to such a degree that there is albuminuria and showers of casts, but he should endeavor to determine what parts of the kidneys are impaired, and to direct his treatment, particularly from the standpoint of dietetics, according to the results which he obtains, permitting the nephritic, who does not retain uric acid in his blood and who does not have an excess of non-protein nitrogen, to have larger quantities of protein foods than is now generally considered wise.

THE CAUTERY IN THE TREATMENT OF STOMACH ULCER.

Scudder and Harvey (*Surgery, Gynecology and Obstetrics*, December, 1916) as the result of experimental research find that the amount of tissue injured by the actual cautery is perhaps slightly greater than that by the knife. This is shown by the presence of a small but definite mucosal ulceration in the two days' specimen following the cautery, while the mucosa in the section, made two days after the knife incision, was completely grown across the line of incision. Further and more conclusive evidence is furnished by a comparative study of the extent of damage done to the muscularis mucosæ by the two methods of incision. Such a study shows invariably a slightly greater damage and a slightly greater scarring of the structures in the incisions made with the actual cautery. However, this difference is scarcely apparent without microscopical examination.

A marked difference in the rapidity of repair was not demonstrated by this study.

It appears from this brief experimental work that the suture of the cauterized margins of the stomach wall is attended by practically a normal reparative process similar to the reparative process following a simple incision with the knife. This having been demonstrated by the actual study of the areas involved may serve, it seems to them, to show that the method is a safe one for ordinary use in the human.

They think that the indications for the employment of the actual cautery in cases of chronic ulcer in the human may be stated somewhat as follows:

The method is applicable to a chronic ulcer seated upon the lesser curvature so far away from the pylorus as to make its removal by excision difficult. Such an ulcer may be cauterized from the center out, as suggested by Balfour, so that the loss of substance occasioned by the cauterization may be as large as one and a half inches or more in diameter, and the edges may be then approximated with the assurance of a proper healing of the wound.

Ulcers seated on the posterior wall of the stomach which are safely approached by a gastrostomy incision, as suggested by W. J. Mayo, may have their edges thoroughly cauterized, and also the base thoroughly cauterized even when it is adherent to the pancreas, and be sutured with the assurance to the surgeon that the reparative process will proceed satisfactorily.

Certain chronic ulcers adherent to the posterior parietes and pancreas do not lend themselves to easy and safe excision and suture. The cautery is sometimes applicable to this special group of cases.

The cautery will destroy any beginning cancer in the edges of the ulcer if the cauterization is thoroughly done. The employment of the cautery saves considerable time over the simple excision method. It is a fact generally recognized that in order to close the stomach following a simple excision of a portion of the gastric wall a very large wound remains to be sutured; and it is a fact that following the use of the cautery no such large gaping wound exists, and the stomach is closed more readily than after wide excision by the knife.

The authors quoted believe that in the conduct of this procedure of cauterization, as also in the conduct of simple excision of a portion of the stomach wall, the stomach should be very carefully mobilized and the part to be operated upon controlled, so that the portion actually cauterized is rendered accessible. The hand of an assistant introduced into the abdomen grasping the

chronic ulcer from the outside is of great assistance in simplifying the operation. Clamps are not often needed for protection from soiling or to prevent hemorrhage.

The suture material employed in human cases in each instance has been No. 1 chromic catgut. It has not been found necessary to reënforce the sutured areas by interrupted linen suture of the peritoneal surface in all cases. If it is possible to place these interrupted linen sutures it is wise to do so. Following any extensive plastic of the stomach, a gastroenterostomy should be done (Mayo).

POLYCYSTIC KIDNEY.

This disease is supposed to be of congenital origin, somewhat obscure as to its pathology, often detected only post mortem, usually bilateral, and ultimately causing death as a rule by renal insufficiency. It is characterized at first only by tumor, later as a rule by hemorrhage plus tumor. The tumor may be discovered accidentally in comparative youth. The hemorrhage plus tumor is usually observed about middle age, as is the final stage of renal insufficiency. The Mayo clinic reports up to May, 1916, 41 patients who on exploration were found to have polycystic kidneys, 26 of whom were recognized clinically.

Braasch (*Surgery, Gynecology and Obstetrics*, December, 1916) commenting upon this unusually large experience gives as symptomatic pain, usually not severe in character, unless the underlying condition be complicated by obstruction or infection, and appearing as a dull lumbar ache. Hematuria, which occurred in 40 per cent of the cases, was usually profuse and intermittent. Evidence of renal insufficiency is a terminal phase. He observes that when clinical evidence suggests interstitial nephritis in young adults, it is advisable to examine carefully for bilateral renal enlargement. The first evidence of renal disturbance is nausea and vomiting. High blood-pressure is not characteristic, but if markedly high both in systole and diastole and accompanied by very low specific gravity, Braasch

believes that all operation is contraindicated. A low specific gravity in itself is of considerable prognostic importance. A normal phthalein may frequently be present with polycystic kidney and does not exclude the condition. The phthalein secretion and specific gravity are likely to be parallel.

A difference of several degrees is likely to be evidenced in the two polycystic kidneys. A large majority of the 41 cases showed either red blood cells or white present in the urinary sediment. The blood was in a number of instances present only by microscopic examination. Tumor was present in about three-fourths of the cases, but in only about one-half of these was it demonstrable bilaterally. By pyelography there is a recognizable deformity of the pelvic outline in more than 50 per cent of polycystic kidneys. The evidence of abnormality is characterized by flattening and obliteration of one or more major calyces; retraction and broadening of the various major calyces; elongation or rounding of the true pelvis, and displacement of the pelvis from its usual position and angle. The retraction of the calyces differs from that occurring with neoplasm in that they are broadened instead of narrowed as in the latter condition. Inflammatory dilatation is differentiated readily by the absence of pus in the urine as well as by the absence of clubbing in the calyx terminals. Because of imperfect urinary drainage, so frequent in polycystic kidney, simultaneous pyelography should not be employed. Also because of the ease of infection ureteral catheterization is to be guarded against. As a precautionary measure an injection of a solution of silver nitrate is advisable before the ureteral catheter is withdrawn.

In 14 cases nephrectomy was done. One patient died as the direct result of the operation. Ten of the 13 remaining patients were traced. All were alive except one who died of pelvic malignancy three years after the nephrectomy. Of the 10 living six were operated on more than three years ago, showing that this operation can be performed if the function of the remaining kidney warrants it. Five patients were explored with one death two weeks later,

two other deaths within two years of the operation. The Rovsing operation was performed on 10 patients, in seven of whom the condition was recognized clinically prior to operation. Two patients died as the result of the operation, and one three years following. Of the remaining seven reported alive, four were operated on within the last year; one two years ago; one three years ago; and another five years ago. Four of this number were operated on because of persistent hematuria. Recent recurrence of hematuria was noted in one patient operated on two years ago. As the result of operation the kidney becomes greatly reduced in size, although it may subsequently increase in size, as proved in a patient observed two years after operation. Therefore, punctured cysts may either regenerate, or others so small that they are disregarded at operation may increase in size, although not as a rule to the original extent. There were 21 cases in which the clinical diagnosis of bilateral polycystic kidney was evidenced, but they were not explored surgically and hence definite proof is lacking.

When there is evidence of marked renal impairment any operation done with considerable danger is of questionable value. When, however, there is evidence of but a moderate degree of renal insufficiency, the Rovsing operation is often followed by considerable benefit. It is particularly indicated in the presence of larger cysts which frequently cause mechanical pressure on the adjacent tissues. The operation is also valuable in checking otherwise uncontrollable hematuria, but it does not always have a permanent influence.

Nephrectomy is indicated only in the presence of wide-spread infection, persistent hematuria, and destruction of renal tissue as the result of mechanical obstruction or lithiasis or other complication. It is, of course, possible only after the function of the remaining kidney has been demonstrated to be satisfactory. Functional tests are of particular value when the surgical kidney has caused marked systemic symptoms not easily differentiated from those caused by insufficiency in the remaining kidney. Whether or not the condition

is unilateral in certain rare instances is not of great practical importance, since surgical treatment is feasible as long as the function of one kidney has been demonstrated to be good even if it is polycystic. Whether or

not a nephrectomy is permissible may usually be ascertained from the general clinical picture, cystoscopic examination, and the functional test of the opposite kidney.

REPORTS ON THERAPEUTIC PROGRESS.

TWILIGHT SLEEP IN OBSTETRICS.

In connection with the obstetric articles in this issue of the *GAZETTE* the following abstracts from a symposium upon "Twilight Sleep" which appears in the *London Practitioner* for January, 1917, are of interest:

SIR HALLIDAY CROOM, Professor of Midwifery, Edinburgh University, says that so far as his personal experience is concerned, he has adopted this method in almost every private case that he has attended during eight years. The bulk of his work is amongst primiparæ, and here he wishes to say that with them it is peculiarly successful, especially with nervous primiparæ, whether young or old. He very seldom employs it with multiparæ, unless in special cases, and with these it has not been so uniformly successful, because of the comparative shortness of the labor. Again, he has used it during his terms of service at the Maternity Hospital, confining it mainly to tedious labors and primiparæ.

Many of those who write on the subject claim special success in hospital, but that has not been his experience. The failures that he has met have all been in hospital, and it is not very difficult to explain the reason. It is impossible, in hospital practice, to maintain the necessary quiet. The delivery room is blazing with electric light, the nurses are constantly going out and in, so that the essentials for a successfully conducted so-called "twilight sleep" labor are wanting. To insure complete success, a darkened room, a quiet house, and the personal influence of a good nurse are necessary adjuncts. Patients are very susceptible to sudden noise or light, both waking

them very readily from their half-slumber. Such an interval of wakefulness may allow the patient to reconstruct in her imagination the whole birth, and once the patient is roused out of sleep it may be difficult to restore the condition.

The dosage and method of administration vary with different writers. From the first he has never laid down a hard-and-fast rule, preferring to treat each case on its own merits. The routine method advocated by Siegel seems to Croom very unsatisfactory. The dosage Croom has employed is usually one-sixth of a grain of morphia and one-hundredth of a grain of scopolamine. In the majority of cases, after this initial dose of scopolamine-morphine, the injections are confined to scopolamine alone in doses of one-two-hundredth of a grain or even less. Primiparæ will require, on an average, four or five injections, if seven to nine hours is the average duration of the sleep. During the crowning stage, Croom always administers a little chloroform, and he has never interfered operatively with scopolamine-morphine narcosis alone. He has always found it well to administer the injection when the labor pains are active, when the uterus is contracting at regular intervals, for he has found the too early use of the drugs is apt to diminish the labor pains. Less attention need be bestowed on the degree of dilatation of the cervix. The regularity of the pains is the main element in the administration.

The advantages claimed for the use of scopolamine-morphine in childbirth are mainly two:

First, the loss of memory. In all cases

in which an extended and fair trial has been made of these drugs, and when the cases have been properly conducted, he has found, like many others, that the woman seldom retains any memory of labor and its sufferings.

One cannot help realizing that, in the present state of our civilization, and in our modern conditions of life, child-bearing has ceased largely to be a physiological process, and probably the sufferings of women have considerably increased. So much is this the case that the dread of the pain of child-birth has become an actual menace to the birth-rate. The abolition of the memory of the event has a very material effect in reducing this painful anticipation. Every case, however, is not by any means a success. In some cases the amnesia is complete and entire; in others it is imperfect, and, in some, a total failure, depending a great deal upon the care with which the drug is employed, a good deal upon the constitution of the patient, and a very great deal on her surroundings. Croom's own experience has led him to the conclusion that the results are distinctly better amongst better educated women, who are accustomed to exercise a certain amount of self-control and inhibition, than amongst women who usually are treated in hospital. He has never found in any of his cases, except one in hospital, any excitement or noisy restlessness as described by some.

Secondly, with regard to the analgesia, his experience is that when the drugs are carefully administered in a primipara, the pain is always lessened and materially modified. The women are sometimes a little restless, because they feel some pain, but they cannot locate it, and this feeling of discomfort sometimes causes them to toss from side to side.

HERBERT WILLIAMSON, Physician-Accoucheur to St. Bartholomew's Hospital, says that his experience leads him to believe:

1. That scopolamine and morphine injections in the majority of cases diminish the pain of labor.
2. That in about one-third of the cases amnesia is complete.

3. That in a small proportion of the cases active delirium is produced by the drug.

4. That labor is prolonged.

5. That the loss of blood in the third stage is increased, but that severe bleeding is not common.

6. That no ill effects are produced in the mother.

7. That the danger to the child is undoubtedly increased.

8. That the dangers are lessened by constant and careful supervision.

9. That the treatment should not be undertaken unless the patient's surroundings are favorable, unless the obstetrician is prepared to remain with his patient from the first injection until labor is completed, and unless skilled help is readily available, should operative interference become necessary.

COMYNS BERKELEY, Obstetric and Gynecological Surgeon Middlesex Hospital, believes that the small experience he has had with a few cases coincides with that of Dr. Haultain, in that there has been a greater percentage of instrumental deliveries and the babies do not seem to have suffered. Three of the women were most violent, one having to be held down by three nurses during the birth of the child and another by three nurses and two students. Their condition was more or less like that of violent drunken women. Although none of the women remembered the birth of the child or any pains connected therewith, the sisters report that during the labor pains the women appeared to suffer just as much as women who had not had any injections.

The experience he has had is not sufficient to enable him to form any definite opinion on the subject of "twilight sleep," except that he is sure that no woman should be subjected to these injections of hyoscine during her labor unless she has a very competent nurse in constant attendance, who is able to procure additional assistance if necessary, and her medical attendant is prepared not only to spend a long time with her during her labor, but also to be within easy call if he has to leave her.

J. S. FAIRBAIRN, Obstetric Physician, St. Thomas's Hospital, considers there are

many difficulties to be overcome before the morphia-hyoscine narcosis can be generally adopted in family practice. When induced to a full degree, it entails constant watching of the patient by skilled nurses and frequent visits by the practitioner. In the lying-in ward at St. Thomas's Hospital, special nurses have been necessary owing to the frequency with which the patients require control. In a private house, apart from special arrangements to secure the necessary quietness and isolation, a maternity nurse experienced in the treatment, and, in cases of long labors, a second nurse to relieve her, would be necessary. Indeed, the requirements are such that it would probably be advisable for the patient to go to a nursing home within easy call of her medical attendant. It certainly involves greatly increased expense to the patient, and it would appear that the induction of the so-called "twilight sleep" will be a luxury only for those willing to pay for it. The busy family practitioner would certainly require a considerably increased fee to compensate for the greater tax on his time and attention. Reserved for long and tedious labors, and for cases presenting the special indications already mentioned, it is a valuable addition to our methods of managing difficult and prolonged labor.

DR. ANNIE MCCALL, Medical Director of Clapham Maternity Hospital, states that they have had 102 cases in the hospital, and, comparing the hyoscine cases with those under their ordinary treatment, they notice a tendency to uterine inertia, decided in some cases, quite absent in others, which tends to give rise to less satisfactory involution of the uterus afterward. When quinine is given in the second stage, this is not so evident.

She has seen no case of restlessness, as described by some authors, but she has given mostly single doses, and she does not feel inclined to increase the amount; rather she wants to use hyoscine alone, getting the sedative action from chloral hydrate or tincture of opium. In one case apparently it stopped the labor pains entirely for fourteen hours, and it often seems to lengthen

out the labor, which is a grave disadvantage.

The condition of the child, known as oligopnea, sometimes gives rise to some anxiety, but, in the cases in which no morphia was used, this sleepy condition does not occur. She has not found the condition to occur after the use of tincture of opium or after chloral, and she is now trying hyoscine alone. She has not used the drug in any case in which she required specially good action of the uterus, as in contracted pelvis, twin labor, and antepartum hemorrhage.

She thinks the drug or drugs have a distinct place in our management of labor, though personally she has more to learn about it. In some cases they are of the greatest value, but are not suitable for general use, and she deplores the advertisement of it as "twilight sleep" in the lay press.

J. P. HEDLEY, Obstetric Physician (with charge of out-patients), St. Thomas's Hospital, etc., says that the administration of morphia hydrochloride gr. $\frac{1}{4}$ and hyoscine hydrobromide gr. $\frac{1}{150}$, followed by dose of $\frac{1}{450}$ gr. of the hyoscine every hour during childbirth, has no obviously bad effects on the mother or the child.

In the majority of cases the amount of suffering is decidedly decreased, and in many there is only a hazy, if any, recollection of the process of labor.

At St. Thomas's Hospital all the patients to whom he has given this treatment have been primigravidae. The patients have not the same self-control as those to whom no drug has been given, and require a nurse constantly with them; they are inclined to move about excessively during the pains, and do not bear down strongly; as a consequence the number of forceps cases has been more than doubled.

He considers this treatment most useful in cases in which the first step of labor is tolerated badly, and when it seems likely to be long.

He never gives the initial dose in the second stage, because the chances of getting a good result are small, and because

it has the effect of making the babies blue and sluggish at birth. In this stage chloroform seems to him to be more suitable.

THE DIAGNOSIS AND GENERAL TREATMENT OF SYPHILIS.

In the *American Journal of the Medical Sciences* for October, 1916, FORDYCE points out that the fate of the syphilitic individual depends upon the early diagnosis of his infection and the intensity with which treatment is carried out in the first six months. In the accomplishment of this purpose the modern aids to diagnosis have rendered great service. The dark-field illumination furnishes a valuable means of corroboration in all suspicious genital sores and assists in determining the nature of extra-genital lesions which may simulate chancre. It should be employed in every case of chancroid to confirm or rule out the possible coincident infection with the *treponema pallidum*.

The Wassermann test fills a large field of usefulness not only as a diagnostic medium but as a guide to the effect of treatment and criterion of cure. It is of special value in all conditions of obscure etiology referable to the cardiovascular system, cerebrospinal system, or viscera in which syphilis might be a factor, and in cases with an indefinite clinical picture, such as neurasthenia, febrile attacks, rheumatic pains, etc. Its interpretation is of great importance and requires as much training and experience on the part of the practitioner as does the interpretation of the physical signs.

The examination of the spinal fluid enables us to determine the activity of the luetic process in the brain or cord, to distinguish the various pathological types affecting the central nervous system, and in many cases to differentiate between these and non-syphilitic affections. Recent investigations have shown that an analysis of the spinal fluid is not complete unless the Lange or colloidal gold test is performed in addition to the Wassermann reaction and a cytological and chemical examination. Its chief usefulness lies in distinguishing

true paresis from types of cerebrospinal syphilis which simulate it, and in diagnosing incipient cases before the clinical syndrome is established. This affects chiefly the prognosis, as our main hope lies in the early diagnosis and treatment of these cases, for when degenerative stigmata are already present the outlook is not so encouraging, for sooner or later relapses occur.

In primary syphilis where the spirochetes are demonstrated and the Wassermann reaction is negative it is possible to cure syphilis with salvarsan alone. It cannot be determined how many doses are required, and as there may be a dissemination of spirochetes even in the presence of a negative Wassermann reaction it is better, therefore, to err on the side of safety and to give at least eight to ten doses and follow this with mercury for perhaps six months.

In secondary syphilis when the early rash is present and the Wassermann positive it is better to precede the salvarsan with several injections of a mercurial salt, preferably a soluble one, on account of the economy of time. In this way an effect is produced on the spirochetes, and when salvarsan is given the temperature reaction and an intensification of the rash—that is, a Herxheimer reaction—can be avoided. After the salvarsan is begun the treatment is to be continued. The dermatologist and syphilologist should keep in mind the possibility of the involvement of the nervous system in secondary syphilis, and a complete status should be made when the patient comes under observation so that this record can be compared with any subsequent developments. In this way we are often enabled to detect the very earliest changes which manifest themselves objectively in the nervous system. The most frequent are irregularity of the pupils, persistent headache, and optic neuritis, or auditory disturbance.

In latent syphilis with a positive Wassermann reaction an investigation should be made of the cardiovascular and of the nervous systems or of previous involvement of any of the viscera, as, for instance, syphilitic hepatitis. In cardiovascular syph-

ilis the prolonged use of mercury in connection with potassium iodide is probably of more value than the haphazard use of occasional doses of salvarsan. In other words, in tertiary syphilis with a positive Wassermann reaction without involvement of the central nervous system the beneficial effects of potassium iodide cannot be too strongly insisted upon. In bone and periosteal lesions attended by severe pain there is no drug in the Pharmacopœia that produces so rapid an effect in relieving the pain and reducing the neoplasm.

THE TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

SWIFT in the *American Journal of the Medical Sciences* for October, 1916, wishes to say a word as to the technique of intraspinal treatment. In most of his work at the Rockefeller Hospital the blood was withdrawn one hour after intravenous treatment, and the serum diluted to 40 or 50 per cent with normal saline and injected in quantities of 30 to 40 Cc. of this dilution. It was thought that the dilute serum was less irritating, but for the past two years at the Presbyterian Hospital they have bled the patient one-half hour after the intravenous treatment and injected 15 Cc. of whole heated serum without any more reaction than with the older method. Most of the patients now receive both the intravenous and the intraspinal injections on the same day, and return to their usual occupations the following day. In this way a minimum of time is required. It is necessary to keep some patients in bed for longer periods. In such instances they try to give the treatments on Saturdays, so that the patients may be in condition to work by Monday morning.

It has seemed to Swift that the treatments are better borne if not repeated oftener than once in two weeks. This is especially true in tabetics or patients with spinal syphilis. In paretics or patients with cerebral syphilis the intervals may be shorter. At times it seems wiser to lengthen the intervals. It is well to bear in mind that a certain amount of irritation always

follows the introduction of any foreign substance into the subarachnoid space, and the effect of this should be allowed to disappear before the treatment is repeated. A good rule to follow in any form of treatment of cerebrospinal syphilis is not to push the treatment so hard that the patient's general health is depressed. With each treatment there should be some improvement in the general condition; at least there should be no retrogression; for if a depressing treatment is repeatedly added to a more and more depressed condition the ultimate effect will be injurious rather than beneficial.

The treatment of the several forms of syphilis of the central nervous system presents different problems according to the stage of the disease and the individual patient. One general principle which should always be considered is that in any patient who shows evidence of involvement of the cerebral meninges or brain, salvarsan treatment should be preceded by a short course of mercury to prevent the possible occurrence of a Herxheimer reaction in the region of vital nervous centers. Fortunately such distressing reactions are rare, and can be obviated by proper preliminary treatment. If the presence of gummata is suspected a vigorous course of potassium iodide is often followed by marked improvement. It has seemed to Swift that the response of cases in the tertiary stage to salvarsan has been more marked and lasting if the courses of salvarsan have followed treatment with mercury and iodides. Gummatus exudates resolve under this preliminary treatment, and the spirocheticidal effect of the salvarsan is more readily brought into play.

In the meningitis of the secondary period the response to alternate courses of salvarsan and mercury has been prompt and permanent in all of Swift's cases. Gennerich is of the opinion that all these cases respond more rapidly to combined intravenous and intraspinal therapy, and advises giving two intraspinal treatments after the cerebrospinal fluid has become normal. Following any form of treatment in this condition the cerebrospinal fluid should be examined

in two or three months after treatment has been stopped, and every six months for two or more years thereafter to forestall relapses.

In the tertiary forms of the disease, the so-called interstitial forms, alternate courses of mercury and iodides and of salvarsan are usually followed by decided improvement, both clinical and in the condition of the cerebrospinal fluid. If possible the fluid should be examined after each course or each pair of courses. Not infrequently it will be found that the fluid has become normal after a few months' treatment. If so the prognosis is good and treatment should be conducted along general lines. On the other hand, if the strength of the Wassermann reaction is the same or only slightly altered after four to six months of intensive general treatment it may be well to resort to intraspinal therapy.

SCOPOLAMINE-MORPHINE IN LABOR ("TWILIGHT SLEEP").

The *Lancet* of September 30, 1916, tells us that for about two years an energetic press campaign has been carried on in England with the object of interesting the lay public in the administration of scopolamine and morphine to parturient women as a means of reducing or annihilating the pains of child-birth. So persistently have books, articles in newspapers and magazines, and advertisements been published that there can be few practicing obstetricians who have not been asked for their advice about "twilight sleep" by expectant mothers. A good many practitioners and some specialists in obstetric medicine have tried the method—or some of the numerous varieties of the method—for themselves, and hold definite views for or against it, based upon their own experience; but a great many have not thus experimented, and in consequence are obliged to rely for their opinion upon the authority of text-books, current medical literature, or oral communications from enterprising colleagues. The information received in this way has been of a vague and varied sort, as is the evidence available as to the advantages and

limitations of this method of alleviating the pangs of labor.

The use of scopolamine, an alkaloid isolable from *hyoscyamus niger*, and isomeric, if not identical, with hyoscyne, as an anesthetic or an adjuvant of other anesthetics in surgery, originated with Schneiderlin; but it was not until three years later that Von Steinbuechel reported his employment of it for a similar purpose in labor. It was, however, the work of Krönig, Gauss, Blos, Korff, and others that first drew widespread attention to the usage of scopolamine and morphine; and it is to Gauss that the phrase *Dämmer Schlaf* ("twilight sleep") is due. These continental authorities advanced the theory that it is possible by suitable dosage, repeated and controlled according to certain indications, such as Gauss's memory test, to render a woman, after her delivery, oblivious of everything that has occurred during labor, and to do this without appreciable evil consequences to either mother or child. They did not suggest that the woman should be impervious to pain at the time; on the contrary, if anesthesia as deep as that is thus produced they take it as evidence of dangerous overdosage. Their views were very hotly contested, soon after publication some ten years ago, by many leading continental obstetricians. The principal, but not by any means the only, objection urged was that this use of scopolamine and morphine distinctly increases the fetal mortality. The answer of the Freiburg school to this criticism was mainly an alleged failure of the critics to follow out minutely the exact technique of administration; and the presence of impurities in the drugs used was also put forward as an explanation of unsatisfactory results.

From that day controversy on these lines has continued, and hitherto the mass of expert opinion has not been converted to the views of Krönig and his colleagues, although many practitioners have sided with them. One member of the Freiburg school, Siegel, has introduced a modified method in which morphine is discarded in favor of "narcophin," and Gauss's memory test is abandoned altogether in favor of a routine dosage. To some extent this obvi-

ously weakens the force of Gauss's main contention in reply to his critics. In America scopolamine and morphine have been extensively used in obstetrics; and a lay press campaign has been conducted on similar lines to that which is now proceeding in England. In spite of many favorable reports, the bulk of informed American opinion seems to be against the method. Practically all the best-known American specialists condemn it for ordinary cases, and the leading text-books teach the same doctrine; the most recent authoritative monograph in midwifery may be given as an instance.

In England "twilight sleep" has been given a fairly extensive trial. Sir Halliday Croom early reported favorably upon it, and continues to support it; and several other practitioners have at various times during the last eight years published complimentary accounts of it. There has not been, however, any general assent in the profession to the position of those who advocate scopolamine and morphine as a routine for ordinary cases, and who indorse the Freiburg view of this combination of drugs; almost with unanimity the British leaders proclaim that its dangers and disadvantages for most cases of labor outweigh its benefits. Nor is this merely a parrot-cry; the matter has been put to the test of actual practice by most, if not all, of those who take this line. In one London lying-in hospital four separate methods of procuring "twilight sleep" have been carefully tested; and the verdict is that those methods which do not endanger the child fail to produce "twilight sleep," whereas those that do have the latter effect are not safe for the child.

The medical profession is admittedly not unanimous on the subject. And the majority, though it happens to include nearly all those with special opportunities for getting at the truth and with special qualifications for turning these opportunities to the best account, may conceivably be mistaken. Some further improvements in technique, in dosage, in control of results may yet remain to be introduced; and the opinions of the skeptics may thereby be modified.

But at the present moment it is unquestionably true that the medical profession is not convinced of the safety of "twilight sleep," and does not admit that its advocates in the profession have proved their case. Probably the pronouncement in Latham and English's *System of Treatment* sums up current teaching accurately. In this work Dr. Llewelyn Powell states that certain special circumstances may render scopolamine and morphine justifiable and advisable treatment, but he condemns it as a routine method. In this connection it is important not to overlook the fact that success with any newly introduced treatment is far more apt to be reported than failure. It is possibly true that the critics and opponents of "twilight sleep" have not been more numerous in recent medical literature in England than its supporters; but inquiry amongst those who have tried the method on any large scale in maternity institutions reveals a degree of dissatisfaction very much greater than a summary of published cases would indicate.

TREATMENT OF NEURASTHENIA.

RIGGS in the *Bulletin of the Johns Hopkins Hospital* for October, 1916, writes on this topic and says that only after a fair working knowledge of the human machine when in order has been attained and the genesis of nervousness in general, as a disorder of the mechanism, is thoroughly understood, is reference made here and there to one or more of the particular symptoms complained of, but these are treated largely as illustrating the lessons, and as interesting only from this point of view, rather than as important items in themselves.

Next, the reëducation deals directly with the abnormal condition and only through it indirectly with the more troublesome symptoms of the case, explaining their nature and genesis when possible. The condition which they signalize bears the emphasis and its cure is the main theme. Every effort is thus made to help the patient to evaluate his symptoms by rationalizing them and then giving him reasonable grounds upon

which to shift his interest and attention away from feeling to action.

Such evidence as can be drawn from the patient's actual current experiences in following out his schedule is, of course, utilized to demonstrate the principles discussed and to make the theoretical reëducation square with practical application.

From first to last, every effort must be made to change the point of view of the patient from that of morbid egocentricity to one of a healthful, positive purpose in life. Objectiveness must take the place of subjectiveness, ambition and courage must replace introspection and fear, and the patient must be taught that it is his right and duty to demand quiet and efficient service from his body and mind. He must realize that they constitute an apparatus which is the means, not the end, of life. The philosophy of acceptance must be adopted as the basis of rest and as the starting-point of work, while the ideal of service must be made to crowd out the idea of self-preservation.

Reëducation must include this revivifying of normal ideals, for the whole structure of physical and mental training would collapse without its object—normal life.

Riggs has been struck by some instances—fortunately they have been few, and he believes entirely the fault of his own technique—in which the labor of reëducation and renormalization of physical functions was wasted, and the patients soon slumped to their original subnormal condition because these necessary ideals were not forthcoming. The whole process, being thus without object, was foredoomed to failure.

The physical part of the treatment is carried out according to a schedule (individual for each patient) in which the elements of exercise, work, recreation, and rest are definitely stipulated, and as nearly as possible in the normal quantity and normal relative proportion.

As soon as the patients have acquired a good working medium of self-control, and their physical condition has become satisfactory—with as little warning beforehand as possible—they are sent home on a trial trip, to apply their knowledge and the fruits

of their practice to their own environment. The stay at home varies from two or three weeks to six months or more in length—according to the case and the environment. A return to Stockbridge, Massachusetts, for treatment usually follows the trial trip. It is in most cases short—a few days only—and usually consists in a critical review of the successes and failures in adjustment, and other experiences, brought out by the trial trip. The next home-going is apt to be permanent, but is often followed in six months or a year by another and final visit of a few days in Stockbridge.

In the milder cases this series of trial trips is not necessary, but all cases, even these, are kept track of for eighteen months or two years after discharge by means of reports written by the patients at regular intervals.

EXPERIENCES WITH THE USE OF COMBINED VACCINES IN THE PRESENT WAR.

In the *Military Surgeon* for October, 1916, MENDELSON writes on this topic with special reference to the tetravaccine typhoid + paratyphoid A + paratyphoid B + cholera.

The preparation of the tetravaccine, as well as other combined vaccines, is based on the experimental work carried out by Castellani in 1901 and 1902, when it was demonstrated that if an animal (rabbit) was inoculated with two or three species of bacteria, agglutinins and immune bodies for all the germs were elaborated, provided a sufficient minimum quantity was given; the amount of agglutinins and immune bodies elaborated for each germ being nearly the same as in control bodies inoculated with only one species. It was also demonstrated that when immunization is obtained by a single inoculation, the amount of agglutinins and immune bodies elaborated is not in proportion to the amount of culture injected, provided a sufficient minimum dose be used. A series of rabbits inoculated with 2 Cc. of typhoid culture gave the same average agglutinin limit and the same amount of immune bodies as a series of rabbits inoculated with 4 Cc. In rabbits no

good results were obtained at first by inoculating more than three species of bacteria; but in more recent experiments it has been shown that in rabbits the tetravaccine typhoid, paratyphoid A, paratyphoid B, and cholera induced protective substances for the four germs in the rabbit.

The usual objection raised against the use of the mixed vaccine is that it will probably give a much smaller amount of immunization than simple vaccine, and that in paratyphoid A and B, being diseases of less importance than true typhoid, it would be a mistake to run such a risk. This belief is not supported by some of Mendelson's investigations. He is not in a position now to give any elaborate statistics, but he examined the blood of more than 100 individuals inoculated with the tetravaccine for agglutinins. In ten he studied the agglutinin curve for several weeks.

The individuals inoculated with the tetravaccine produce a very large amount of agglutinins for typhoid, a fairly large amount of agglutinins for paratyphoid A and paratyphoid B, and a certain amount for cholera, which varies between the limits 1.20 to 1.150. Comparing the results with those obtained in control individuals inoculated with typhoid, paratyphoid A, paratyphoid B, and cholera, he finds that the amount produced is not distinctly smaller.

With two assistants Mendelson immunized with this tetravaccine 50,000 individuals. Immunization entails two inoculations. A third can be given, but is not essentially necessary. This necessarily meant 100,000 injections. The method used was this: At first they took elaborate means to scrub the arm thoroughly with soap and water, drying, and then painting with tincture of iodine; but when inoculating at the rate of several thousand a day (and this is not excessive, because one Sunday morning, in the city of Tirana, two of them, working constantly from 7:30 until about noon, inoculated 3887 soldiers), they found it impossible to spend the time necessary for this procedure, and depended entirely upon the iodine alone, with excellent results.

The reactions were usually very mild and consisted of a small area of redness, a slight

local temperature, and some tenderness. General reactions were very seldom complained of, and when inquired into revealed a slight headache and a general inaptitude. These particulars were carefully looked into in all cases upon the second inoculation.

It seems hardly permissible to elaborate upon the technique of inoculation, yet with continued practice one acquires a skill that almost assumes the dignity of an art. They have found it possible, when everything is going right, to inoculate at the rate of 400 an hour. The left arm is chosen, the skin over the insertion of the deltoid iodized, and a quick stab, as though one were shaking a drop of ink from a pen, results in placing the point of the needle at the exact depth. The syringe is held in the right hand between thumb and index-finger, while the tip of the ring-finger is placed just above the point of the needle, acting as a check to the force applied. No after-treatment such as massage is used.

Their colleagues inoculated in old Serbia, where the greatest number of troops was stationed, more than 120,000 soldiers and prisoners, and also some of the civil population was given the benefit of this inoculation. As a result of this vast amount of work they came to the following conclusions: First, that it has been positively demonstrated that animals inoculated with more than one species of bacteria, within limits, developed agglutinins and immune bodies for all the species injected, the amount of such being not distinctly inferior to that observed in control animals inoculated with one species only. Second, the inoculation of a combined vaccine is harmless. They had no septic or other accidents in any of the more than 50,000 men inoculated, thus entailing more than 100,000 injections. They have never discovered any really serious reactions, either local or general, the inoculated persons being, as a rule, able to attend to their duties in from twenty-four to forty-eight hours after injection. Third, the inoculated persons developed protective substances for the four germs—typhoid, paratyphoid A, paratyphoid B, and cholera. The amount of agglutinins present for each of the four germs is practically the

same as in control individuals inoculated with the monovaccines typhoid, paratyphoid A, paratyphoid B, and cholera. Fourth, they came to the conclusion that the tetra-vaccine typhoid, paratyphoid A, paratyphoid B, and cholera should be used as a matter of routine to inoculate the troops taking part in the present war, greatly exposed as they are to the four diseases, typhoid, paratyphoid A, paratyphoid B, and cholera. Its use renders it possible to give a contemporaneous protection for the four maladies by a simple and rapid procedure.

THE RELATION OF THE HYPOPHYSIS TO CERTAIN CLINICAL MANIFESTATIONS AND THE THERAPEUTIC APPLICATION OF THE EXTRACTS.

MILLER in the *American Journal of the Medical Sciences* for October, 1916, writing a paper on this subject says that mention should be made of the use of posterior lobe extracts in the treatment of bronchial asthma. On account of pituitrin having an effect on blood-pressure somewhat resembling adrenalin, several publications have appeared recommending its use in bronchial asthma. This is apparently wrong. Pal, Fröhlich and Pick, Baehr and Pick, and others have shown that pituitrin produces bronchial spasm, while the relief given by adrenalin is due to its power to dilate the bronchi. Baehr and Pick have also shown that when combined with adrenalin the pituitrin action on the bronchi is inhibited by the adrenalin.

TETANUS FOLLOWING GUNSHOT WOUNDS.

In the *Bulletin of the Johns Hopkins Hospital* for October, 1916, COLSTON reports on a series of cases of tetanus and points out that his series is, of course, too small to demonstrate the value of any method of treatment. The most striking result was obtained in Case 2, with the intraspinal administration of magnesium sulphate. This method was first introduced after the experimental studies of Meltzer and Auer. Blake reported two cases in

which the procedure was used successfully. Miller reported another successful case and added a review of all cases treated by the method up to 1908. Falk reported favorable results in cases occurring during the Balkan war, but prefers the subcutaneous method of administration. Kocher emphasizes its value in severe cases, the treatment serving to control the tonic spasms until enough antibodies have been produced to successfully combat the toxins.

Stadler reported, previous to the war, two severe cases treated with magnesium sulphate, one of which terminated fatally. He collected from the literature 51 cases of various types treated by this method with a mortality of 35.5 per cent. He contrasts these figures with those reported in large series of cases treated with serum or by other methods. The mortality of cases treated without serum was found, according to a compilation of many statistics, to be between 62 and 85 per cent. The mortality of cases treated with serum was found to be between 39 and 64 per cent. In cases with a long incubation period treated with magnesium sulphate the mortality was only 9 per cent.

Eunike collected 27 cases treated with intraspinal injections of magnesium sulphate, the mortality being 33 per cent. His own mortality in eight cases was 50 per cent, but it must be remembered that tetanus from gunshot wounds in war has a higher mortality than under ordinary conditions.

Kümmell, in a recent article, gives some interesting figures relative to the mortality from tetanus. Of 350 cases observed in hospitals near the front, 70 per cent resulted fatally; while of those observed in base hospitals (i.e., with a longer incubation period), 25 per cent died. He recommends the magnesium sulphate treatment, but gives no statistics as to its value.

English writers give a somewhat higher mortality figure, those of Bruce being 78.2 per cent for cases near the front, and 57.7 per cent for cases occurring in British base hospitals. In an earlier report of a smaller series of cases, Keogh found a total mortality of 71.8 per cent. Magnesium sulphate had been used only in a very few of these

cases, and usually by the subcutaneous method. English writers have obtained the best results with the intraspinal injection of serum.

From the reports of those who have used the intraspinal administration of magnesium sulphate, it would seem that this treatment is of great value in cases in which a fatal outcome is to be feared from spasm of the glottis or from exhaustion; and it is with the hope that this method will be more generally used in properly selected cases of the disease that these cases are reported.

ALCOHOLISM AND DRUG ADDICTION AS COMPLICATING FACTORS OF ANESTHESIA.

McMECHAN in the *Lancet-Clinic* of September 30, 1916, points out that the alcoholic is a patient already partially under the influence of an anesthetic. Unfortunately the excitement stage of alcoholic narcosis is far more prolonged than that of other anesthetics, and the effort to administer nitrous oxide, ether, or chloroform not only exacerbates the pugnaciousness of these unmanageable patients, but almost invariably precipitates the following symptoms-complex:

1. An ascending degree of cyanosis.
2. An increase of excitement.
3. Tonic or clonic spasms of the musculature, embarrassment of inspiration; asphyxia and abrupt cardiac arrest; or
4. Overventilation, followed by
5. Acapnia with pallor, apnea, and gradual cardiac exhaustion.

The fact that alcoholics are under and out of anesthesia with disconcerting rapidity makes chloroform an especially dangerous anesthetic for these hazardous risks, because its administration invites the incidence of cardiac fibrillation.

While experts can handle alcoholics under nitrous-oxide-oxygen anesthesia, with or without supplemental etherization, the method is extra-hazardous as a routine and the margin of safety so narrow as to invite disaster. It is almost impossible to avoid imperiling cyanosis in alcoholics under nitrous-oxide-oxygen, and this cyanosis, aside from its untoward results, may abruptly

terminate in asphyxia and cardiac dilatation during the stage of excitement and struggling.

Two techniques of anesthesia offer a safe and efficient method of narcosis for alcoholics:

1. The essence of orange-ethyl-chloride-C1E5 mixture by the semi-open drop method with concomitant oxygenation, and

2. Ether-oil colonic anesthesia (Gwathmey), with the preliminary use of paraldehyde.

The former is satisfactory because the essence of orange obtunds the inconvenient airway reflexes, so conspicuous in alcoholics, the ethyl chloride obviates cyanosis, and the C1E5 mixture gives all the advantages of these agents used separately, without any of their disadvantages. Concomitant oxygenation enables the anesthetist to prevent mild grades of persistent cyanosis and to induce and maintain, with less danger, a deeper and more satisfactory plane of surgical anesthesia. The semi-open method of administration gives just sufficient rebreathing to conserve the requisite carbon dioxide tension to prevent acapnia and apnea as a result of overventilation should struggling and excitement supervene.

Ether-oil anesthesia is a satisfactory routine method, especially in the obese and plethoric type of patients. The minimal effect upon the brain and kidneys of this method and its freedom from respiratory reflexes, provided an open airway is steadily maintained, make it a technique of exceptional value.

Postoperative alcoholics recover from anesthesia by crisis, but they are very subject to untoward sequelæ. These must be combated by the remedial measures indicated in the preparatory regimen.

Provided the narcotic addict's drug balance is painstakingly conserved, he will withstand anesthesia and operation with impunity. Bishop, the greatest authority in this matter, has formulated the following dictum:

"The reduction of a drug of addiction below the amount of body need robs the addict of his most valuable asset in securing and maintaining recuperative powers."

Drug addicts are present in several types, each of which requires a somewhat different method of handling.

1. Those addicts who, except for the habitual use of opiates and a psychopathic taint, are otherwise practically normal.

2. Those addicts who use opiates to control the pain or symptoms of certain diseases, such as malignancy or diabetes; and

3. Those addicts in whom the use of opiates is merely one phase of an entire moral and physical degeneration.

The first class react to anesthesia in almost the same manner as alcoholics. In handling them it is important to make their drug addiction serve the useful purpose of preliminary hypnotic medication. Each case should be studied in order to arrange the dosage of the opiate, so that the period of somnolence will coincide with the induction stage of anesthesia. If induction is attempted during the excitement period of the narcotic, addicts are quite as unmanageable as alcoholics.

In the second class of addicts every effort should be made, unless an emergency exists, to put the addict into approximately normal condition before operating. These patients, and the derelicts in whom the toxemia of infections and the ravages of malignancy have depleted the body of all the forces of resistance and recuperation, should be given the benefit of nitrous-oxide-oxygen anesthesia. These patients must be persistently overoxygenated, as their tendency is toward exhaustion of the circulatory and respiratory systems on account of the depletion of tissue respiration.

If these addicts show a breathing test of less than from 30 to 40 seconds, they should be considered unfit risks for general anesthesia.

In conclusion it may be stated as a working principle that alcoholics and drug addicts should be operated on under local or conductive anesthesia, except in the presence of infection or a tendency on the part of the tissues to slough, and only under general anesthesia when no other method of narcosis suffices for the required operative procedure.

When alcoholics or drug addicts are operated on under general anesthesia, they should have all the advantages of a thorough preoperative régime, a cautious and painstaking anesthesia, and a carefully guarded recovery.

Alcoholism is one of the important factors in the morbidity of surgery and anesthesia that still defies the skill of the operator and the precautions of the expert anesthetist. Its elimination is a desideratum devoutly to be wished.

REPORT ON THE COMPLEMENT FIXATION TEST FOR GONORRHEA.

In the *Cleveland Medical Journal* for November, 1916, SHUPE points out that in 1901 Bordet and Gengou discovered the phenomenon of complement becoming inactive when the microorganisms are mixed with their homologous antisera. It was not until 1906 when Mueller and Oppenheim first used this method for the detection of antibodies in the blood stream of patients infected with the gonococcus. In 1911 Schwartz and McNiel established the fact that the gonococcus family was a heterogeneous one. Since that time several different strains of gonococci have been used in the preparation of antigen.

The fixation of complement in the gonococcus test is the result of the interaction of antigen and its own antibody. This test, however, is not specific, as one may be led to believe, since several facts step in which make it more difficult to perform than the Wassermann. Among these factors are: (1) Multiplicity of strains of the gonococcus; (2) the relative infrequency of blood-stream infection; (3) small amount of antibodies formed by the disease in an uncomplicated form. The report is based on a little over 1000 tests. Two methods for measuring the reagents were used, namely, the metric and the drop method. The drop method was found to be by far the most satisfactory. The graduation of amboceptor must be watched carefully, as it will not allow as much variation as in the Wassermann.

Three different preparations of antigen were used: Parke, Davis & Company's, Mulford & Company's, Dr. Warden's Fat Extract of the Gonococcus. The Parke-Davis antigen was the most satisfactory. Each box of antigen must be titrated. An antishoop hemolytic system has been used throughout.

With the exception of the first 200 cases, the examinations have been performed on clinically cured cases, cases of arthritis, epididymitis, and vulvovaginitis.

Chronic prostatitis, seminal vesiculitis, and posterior urethritis give 80 per cent positive.

ANESTHESIA IN EPILEPSY.

In the *Lancet-Clinic* of September 30, 1916, MYTINGER states that most of the standard authorities advise the use of chloroform in patients of this class. Chloroform by inhalation is an old remedy for so-called uncontrollable convulsions. Having seen convulsive seizures appear during the stage of maintenance of ether narcosis, he believes that the pushing of chloroform to the point of abolishing the convulsive attack would be dangerous in the extreme.

He has therefore resorted to the use of ether in these cases, using the nitrous-oxide-ether sequence with the Bennett inhaler, supplementing with oxygen when indicated. A reasonably smooth anesthesia is obtained and there is no inconvenience to the operator. The induction period is prolonged, due in all probability to the sluggish circulation, to the resultant delayed absorption, and often to the necessity of waiting for a convulsive seizure to subside before taking the patient to the operating-room.

With the onset of an attack during induction a high degree of cyanosis may rapidly develop, and it is often necessary to apply the tongue clamp and resort to the use of the pharyngeal tube. In some instances strong support of the jaw will suffice in maintaining an open airway. Throughout the stage of maintenance one must be constantly on the watch for the appearance of convulsive manifestations.

The after-care of these patients presents no particular difficulty other than the maintenance of an open airway, and the nurse should always be instructed to support the jaw until the patient is pretty well out of his anesthetic.

After having administered anesthesia to a number of these patients, one gets the impression that he gives a double anesthetic, one to the patient and one to the disease itself; for, after the induction has proceeded quietly almost to the stage of narcotization, a convulsive seizure appears and it seems that one must begin all over again.

In conclusion, Mytinger emphasizes the fact that these cases are not choice ones, from an anesthetic standpoint, on which to display one's anesthetic prowess. The uninitiated will blame the anesthetist for the epileptic manifestations whatever they may be, even though these are entirely outside of his control. However, one who handles these cases can at least have the satisfaction of work well done, for he alone knows and appreciates the difficulties which he has had to surmount.

TREATMENT OF HEREDITARY SYPHILIS.

In the *American Journal of Diseases of Children* for October, 1916, SYLVESTER states that in the Children's Hospital in Boston he has treated a few over one hundred patients with hereditary syphilis in the last two years. Of these, fifty-eight have now developed enough clinical evidence to be of value. He has naturally treated no fetal patients. Of the second or early type, he has treated fifty patients, most of them coming in when under six months old; of these, eighteen, presenting clinical evidence of early syphilis, positive Wassermann reaction, but not seeming acutely sick, received mercury alone—thirteen by inunction, five receiving mercury with chalk. None died and all did fairly well, were clinically free from signs in from two to six months (none under two months), and only two now have a negative Wassermann.

These have been treated for over a year and a half. All who have been treated for more than six months seem to be as healthy as the average baby.

At first all patients were treated with neosalvarsan, but as the drug became scarce and costly it was reserved for use on those who were very sick and who it was felt would die within a few days on mercury alone. Of the seventeen patients so treated only four died, one two days, one five days, and two between two and three weeks after treatment, who did not return to the hospital as directed. These latter two deaths were apparently from bronchopneumonia. The remaining thirteen of these seventeen desperately sick babies are now, after a period of months, as well as the average baby. Only eight of them, however, have a negative Wassermann; only one of these eight has been treated for less than six months. Nine other patients not desperately sick were treated by neosalvarsan and mercury. In them the effect of the neosalvarsan was even more rapid than in the desperately sick children in causing the disappearance of mucocutaneous lesions. Of those nine, seven, now treated for nearly two years, have had two negative Wassermann tests three months apart.

His maximum dose of neosalvarsan has been 0.4 gm. in babies of 1½ years or over. At one month or under he gives 0.1 gm.; from one to six months, 0.2 gm.; from six months to a year, 0.25 gm.; and from 1 year to 1½ years, 0.25 to 0.35 gm. He gives the neosalvarsan intravenously in 5 Cc. freshly distilled water, and repeats the dose weekly until all evidence of syphilis except the Wassermann reaction has disappeared. In all cases in which it has been possible the baby has been breast-fed and the nursing mother has received treatment at other hospitals. His largest number of injections of neosalvarsan was seven, in which the dose was from 0.05 to 0.075 gm., which he believes to be altogether too small. There were five patients, however, who received only one dose, varying from 0.1 to 0.2 gm., and they presented no visible le-

sions except pigmentation at the end of from three to seven days. All the patients receiving neosalvarsan were started on mercury on the same day. Most of the patients receiving neosalvarsan were clinically well within one month.

A word as to prognosis in this type of case. Sylvester's experience does not justify the pessimistic attitude of Veeder and Jeans and others, who report an ultimate mortality of about 40 per cent and a morbidity of about 60 per cent. His immediate deaths were four; his ultimate deaths have been none. The morbidity, in patients treated long enough to count, is practically *nil*. These children are not even backward, and are a fine-looking lot of babies. This is quite in contrast with a series of twenty consecutive patients admitted to the hospital wards and treated before the advent of arsenic. These were necessarily severe cases. Of these twenty patients with severe syphilis, sixteen died within two months, one is living, and three cannot be found.

Of the late type of case he has treated eight patients, varying from 4½ to 9 years old. Four, who were treated with mercury and potassium iodide, showed some improvement, and all have positive Wassermann after periods of treatment of from six months to two years. Four have been treated by neosalvarsan and mercury and have improved tremendously in general physical condition within a month after receiving neosalvarsan, but still have a positive Wassermann and the mental condition has failed to reach normal, although considerably improved. Sylvester feels that neosalvarsan, while not wholly effective in this condition, yet offers more hope of improvement than the older remedies. He has used no intraspinal medication, believing that the nerve men were more qualified than he to carry out this procedure.

He has to date treated only five cases corresponding to the latest type. (These are not included in the fifty-eight cases reported above.) Four of these have received neosalvarsan as well as mercury.

Their mothers say they are brighter, "do not act so queer," and are much livelier. All of them have gained more rapidly in weight than before treatment was undertaken. The one receiving mercury alone has also improved and gained in weight. They have, however, been under observation and treatment for too short a time to present evidence of value. Sylvester concludes:

1. Fetal syphilis should be treated by treating the pregnant syphilitic mother vigorously. The balance of evidence shows that the child is much benefited thereby.

2. Arsenic should be used in fairly large doses if immediate intense action is desired.

3. Mercury in one form or another should be used in conjunction with arsenic and continued a long time after all evidence of the disease has disappeared.

4. Treatment should be persisted in for at least two years, after which a negative Wassermann, after six months without treatment, may be considered evidence of a cure.

5. Neosalvarsan appears to be the most favored arsenical.

6. Lesions other than of the central nervous system may be readily relieved.

7. To date the therapy of the lesions of the central nervous system is disappointing but not discouraging.

8. Latent cases should be treated.

NEW REMEDIES FOR SYPHILIS.

The *American Journal of Diseases of Children* for October, 1916, gives a summary of this subject by TOWLE.

Salvarsan natrium is a modification of old salvarsan, which is supposed to be superior to neosalvarsan. It is described by Wechselsmann as follows: Salvarsan natrium contains 20 per cent arsenic, the same amount as neosalvarsan. Like the latter, on exposure to the air it changes to a brown color and becomes less soluble and more toxic. It is more soluble than salvarsan and, by so much, easier to use. In eighteen months Wechselsmann encountered

but four instances of the so-called anaphylactic reaction, all mild. He found the new remedy safe in all stages of syphilis, with doses of 0.3 to 0.45 gm., and suitable for office administration. Two or three injections, one every week, may be given up to a total of forty or fifty. Recurrences were rare. Eruptions, usually resistant to mercury, yielded to persistent salvarsan natrium therapy. In old syphilis the effect on the Wassermann reaction of the blood and of the cerebrospinal fluid varied from prompt to none. For injection Wechselsmann prefers one-per-cent dilutions to the more concentrated.

Dreyfus has used salvarsan natrium with great success in over 450 cases, in from 1 to 1.5 per cent concentration, and in doses rarely exceeding 0.45 gm. Sometimes the drug was used alone, sometimes in conjunction with mercury. If used alone, it was injected three times a week. If combined with mercury, it was given but twice a week. Over 100 ambulant cases were treated without accident, the patients being required, however, to rest until the morning following the injection. Reactions sometimes occurred, but were never more than slight, transient rises of temperature, diarrhea, or attacks of vomiting.

Loeb considers salvarsan natrium as efficient as old salvarsan. His method was to give intravenous injections of salvarsan natrium once a week and intramuscular injections of the mercury salicylate twice a week for a period of four or five weeks.

Pulvis fluens hydrargyri is a mercurial powder proposed by Unna as a substitute for the less easily prepared and more disagreeable mercurial ointment. It is made by rubbing up metallic mercury with a lycopodium powder, previously soaked in oil of turpentine, in the presence of much air and loosely combined oxygen. The powder which results from the process may be used as such or as an ointment base.

A new method for old remedies was invented by Fischel and Hecht, who obtained intensive mercurial effects by injecting a dose of from 0.015 gm. to 0.04 gm. of mercuric chloride or of the oxycyanide of

mercury (1 to from 200 to 400 Cc. solution) into the cubital vein every three to eight days until eight injections had been given.

A few assert that arsenotherapy is efficient without the aid of mercury. This is contradicted by the fact that the search for newer remedies is continued and by the greater prevalence of the combined method. The advocates of arsenotherapy maintain that the method is harmless and is not responsible for the alleged deaths. The opponents answer that, granting the method is falsely accused of death in some cases, the proponents have never produced satisfactory proof of innocence in the remainder; even admitting that the arsenicals merely set a preëxisting process in train which causes the death of the patient, the admission of itself proves the method dangerous; and, furthermore, it cannot be denied that neurorecurrences have increased with increased arsenotherapy.

Regarding its liability to produce the Herxheimer reaction and the state of anaphylaxis, the debate is about even. Finally, we fail to find in the literature any agreement, even among the advocates of arsenotherapy, as to what constitutes the most efficient dose or concentration. Nicholas and Mutot concluded that while the arsenicals are of undeniable value they lose in efficiency if not combined with mercury, and that in spite of all dispute mercury and the iodides still retain their former position and value.

TREATMENT OF INEBRIATES.

McIVER in the *New York Medical Journal* of September 30, 1916, states that caring for these patients until the acute symptoms have subsided will only be a temporary aid. To expect to free them of the alcohol habit in a few days' or a week's time is absolute folly and involves a useless expenditure of time and money. What they need is institutional care where they can be kept for months and years.

All subjects of inebriety should be removed from their present environment to

an institution at least for a time. Here they should be kept under restraint and control until it is considered safe by the physician in charge for them to go.

An institution for the care of these cases should be situated, preferably, in the country. The buildings should be of modern structure with plenty of light and ventilation. The cottage plan is a very good one in order to make it as homelike as possible and at the same time permit proper classification of patients. A farm and industrial plant should be provided to afford employment for the inmates. By this means each inmate could be given work fitted to his or her ability. They should be thoroughly impressed with their weakness and taught that total abstinence from alcohol is the only course for them.

As to how long these patients should remain in the institution, a great deal depends on the individual case. McIVER would say not less than three months for the mildest type, and some will have to be kept for a year or more, and it is doubtful if some would ever be safe in facing the outside world.

When these people leave the institution they should seek new associates and new surroundings. They should start life anew and engage themselves in some active work fitted to their ability, keeping ever in mind their weakness, at the same time remembering that anything short of total abstinence is sure to prove detrimental and will in all probability be the beginning of their downfall.

If we could only impress these people with the seriousness of their weakness and teach them how to live, the problem would be solved. Unfortunately this is extremely difficult, and many cases, McIVER is sure, are utterly hopeless.

The benefits to be derived from a plan of treatment such as McIVER has outlined are self-evident. The difficulty lies in putting it into effect.

The value to the patient would be inestimable. He would be more than self-supporting and become an aid to his family. The procreation of his kind would be

largely prevented. From an economic standpoint, the help to the city and country at large would be marvelous.

The alcohol question will never be solved on a moral basis, but the time is coming when it will be solved, and economy is going to be the main factor. The time will soon be at hand when industrial concerns will no longer employ alcoholics on account of the increased risk, and the whole thing will simply be a survival of the fittest.

The main causative factors of alcoholism are heredity, environment, lack of education, and incidental association. A combination of these enters into most cases. For the past ten years sixteen per cent of the patients admitted to the Philadelphia General Hospital were for the alcoholic wards. Practically all vocations of life were represented, but the lower classes made up the largest proportion.

The statistics before given would lead one to be somewhat skeptical regarding the very high proportion of permanent cures reported by some institutions devoted to the care and treatment of alcoholics.

McIver is quite sure that there is no drug nor combination of drugs which will relieve the obsession for alcohol or opium.

Institutional care with absolute restraint and control for an indefinite time seems to be the most rational plan of treating inebriates.

CLIMATE: ITS USE AND ABUSE IN THE TREATMENT OF TUBERCULOSIS.

Writing in the *Medical Record* of September 30, 1916, FISH points out that in the very nature of things the first question confronting the medical adviser will be, Is the change of climate absolutely essential? In considering this phase of the matter, the physician will do well to remember that countless cases of tuberculosis have been "arrested" without any change of climate.

Having satisfied himself on this score, the medical adviser may then proceed with the following practical catechism based on extended clinical experience:

Assuming that the change is essential,

will the probable results outweigh the sacrifices involved—the breaking of home ties, the loss of business, the countless inconveniences, and the not inconsiderable expenditure? Again, what vital resources does the patient harbor in himself? Is he fitted for travel? Will competent medical guidance be available? Will the food and sanitary arrangements be thoroughly satisfactory? Will the proposed environment harmonize with his mental make-up? Some like a quiet place, others prefer an animated place. Some are irritated by necessary association with strangers, others prefer company. One may not be happy unless his wife is at his side, another may not know what peace of mind is unless she is away.

Often a case will present itself where it seems advisable for a patient to locate permanently in a different climate. Here we are confronted with the additional question, Will he be able to earn his livelihood there?

In short, a thorough knowledge of the patient's habits and characteristics, together with an intimate insight into his peculiarities, is essential; for, in the final analysis, we are treating not consumption but the consumptive.

But, perhaps, the most dominant point to remember in connection with prescribing a climate for a consumptive is that there is no one best climate for all cases, and that some patients will fare well in any fairly good climate providing they adhere to a suitable mode of life.

With these salient thoughts in mind, little difficulty indeed will be experienced in determining upon the proper climatic selection.

TREATMENT OF PNEUMONIA WITH PHYLACOGEN.

In the *New Orleans Medical and Surgical Journal* for October, 1916, ANDERSON writes as follows:

Pneumonia is still one of the most fatal of the acute infectious diseases. The mortality remains very high whether in private or hospital practice, and varies within wide limits, being from 15 to 60 per cent, influ-

enced by the character of the epidemic and the virulence of the infection. When alcoholics and the very aged are stricken they rarely recover, and often the death-rate runs high among vigorous, young adults. Pneumonia therapy remains to-day about what it has been for the past several decades. There is no drug that even approaches a specific, and the research laboratories and workers are yet looking for an immunizing agent or antitoxin that they hope will be as specific in its action as is the diphtheria antitoxin in that disease.

Recently Anderson has had a few cases of pneumonia in both adults and children which he has treated with pneumonia phylacogen, manufactured by one of the largest bacteriological houses in this country. They do not claim that their product is an absolute specific, but the late results of its use have been so gratifying that it is worth the trial in view of the fact that we lack a rational and curative therapy in pneumonia. Not long since the manufacturers sent him a complimentary package through their trade representative in his territory with the request that it be given a trial in the first case of pneumonia that he had, so Anderson presents the clinical report of the cases treated with the product. He wishes to say that the results were little short of brilliant, and since these two cases had been treated along the line usually adopted without improvement or cure, the decided specific action of the phylacogen is the more apparent and positive.

THE DISCHARGING EAR.

BARDES in the *Medical Record* of September 30, 1916, reminds us that running ears are treated with far more encouraging results than formerly, and with simpler methods. The sooner treatment is begun the better. A few words about the prevention of discharging ears may not be amiss. A beginning ear infection can frequently be aborted by means of the ice-bag, a mild cathartic, fluid food, and rest. If the pain is severe, one dose of an opiate is permissible. More than this may mask the symp-

toms. The hourly irrigation of the ear with a warm solution of boracic acid is also allowable. Ear drops and applications in general are apt to be more harmful than beneficial. The ear should be kept clean. An earache should not be permitted to last longer than twelve hours. It is the symptom of an active and perhaps a serious infection, and prompt relief is demanded. It is decidedly unwise to wait for the drumhead to rupture or even to bulge. It is far better to open the drumhead prematurely than to allow the infection to spread. If, on opening the drumhead, no fluid is found, the incised drumhead soon mends and no harm is done. It is needless to state that all work upon the ear should be done under the rules of surgical asepsis.

Many lives have been sacrificed through delay in dealing with a middle-ear infection. Within a short time Bardes saw three persons with meningitis from neglected ears. There are other disadvantages in waiting for the spontaneous rupture of the drumhead to take place. The opening is apt to be faulty. Either it fails to provide adequate drainage or else the drumhead is needlessly lacerated. Such an aperture heals with difficulty, and if repair does take place, the hearing eventually becomes affected, by reason of the intratympanic adhesions.

Never should the drumhead be incised without the aid of a general anesthetic, preferably a whiff of chloroform. This is used both to obviate the intense pain of the procedure and to keep the patient from moving and deflecting the scalpel. The incision should be a free one, not merely a stab. Beginning in the lower posterior quadrant, the incision should sweep upward and backward, behind the ossicles and near the rim of the drumhead, ending outward into the swollen periosteum of the canal. The final sweep has been termed the internal Wilde incision. It depletes and drains the edematous tissue and helps to avert mastoiditis. In the left ear the incision resembles the letter S; in the right the letter Z.

When an infected middle ear is opened,

serum is released, seldom pus. In a few hours the discharge becomes copious and purulent. The more active the flow the better the result. Generally, relief follows the operation. If, however, the symptoms do not abate, it is evident that the infectious material within the mastoid cells is unable to escape into the middle ear proper, and that more drastic measures are required.

Ordinarily the after-treatment of an incised drumhead is simply to keep the ear dry and clean. Irrigations should be used sparingly, if at all. Used too freely they keep the drumhead in a soggy state and hinder repair. A saturated solution of boracic acid with the addition of some alcohol makes a good cleansing lotion. A poisonous solution, such as the bichloride of mercury, should never be employed in infants, lest it escape into the throat. The cotton wipe is the best implement for cleaning the ears. The patient can assist the cleansing process by inflating the ear after Valsalva's method.

Regarding the treatment of a running ear, the prescribing of ear drops without first ascertaining the precise nature of the lesion in the ear is as unscientific as it is generally unavailing. The use of peroxide of hydrogen is especially objectionable. If it gets into the middle ear it may not be able to escape.

It is useless to attempt to check a discharging ear by local measures so long as reinfection from the nose is apt to occur. It is first necessary to cure the nasal disorder. The removal of diseased tonsils and adenoids in children will do more toward preventing an ear infection and stopping a running ear than anything else will. It is Bardes's plan, when removing tonsils and adenoids of a child with a running ear, to supplement the procedure by removing the granulations from the middle ear and freshening the edges of the drumhead. Most running ears are controlled by doing so.

Frequently there is an obstacle in the middle ear which favors the continuance of the aural discharge. To overcome this, it may be necessary to enlarge the opening into the middle ear for better drainage, to

sever adhesions in the middle ear, or perhaps remove aural polyps or granulations. Frequently an aperture in the drumhead can be made to close by slitting or by freshening the edges of the perforation or perhaps by placing a piece of paper over the opening. If the middle ear can be kept dry the discharge generally ceases. In the hands of the physician the suction pump and the wick usually accomplish this end.

The local remedies used to control an aural discharge have for their object the stimulation of the sluggish mucosa to healthy action. Quite often a discharge of long standing can be brought under control in a short time by the daily use of an alcoholic solution of boracic acid dropped into the ear. A persisting discharge may require something stronger, perhaps a twenty-per-cent solution of iodine or else a ten-per-cent solution of chromic acid. Stimulation by the use of heat after Beers's method of inducing hyperemia is most useful in certain stubborn cases.

Much of the difficulty encountered in the treatment of these diseases is owing to the fact that the affected parts are out of sight. The tiny attic syringe is helpful in many of these cases.

A decade ago it was hoped that the radical mastoid operation of Stacke would enable us to cure all discharging ears, but these expectations have not been realized. In this operation the various compartments of the middle ear are thrown into one kidney-shaped cavity. Besides, the Eustachian orifice is closed and the ossicles are removed, together with all diseased and cellular bone in the middle ear. Unquestionably the procedure is an invaluable one in selected cases, but generally its performance should be deferred until simpler measures have been tried. At the present time the operation finds less favor than it formerly did. The operation has many objectionable features which are usually withheld from prospective patients. The best statistics of the operation show a cure of but 50 per cent. One-tenth of the persons operated upon finally die of meningitis. Others develop facial paralysis, and nearly all eventu-

ally lose their hearing. The assertion that the radical operation does not affect the hearing can safely be challenged. Any procedure in which the ossicles are removed and the middle ear is covered with scar tissue is bound to seriously disturb the hearing. In many instances it takes a year or more for this to occur.

A better operation for most cases is the mastoid operation of Schwartze, which provides for the removal of the mastoid cells and establishes a free connection between the mastoid antrum and the tympanic chamber. The ossicles are not disturbed and the better drainage and stimulation generally cause the discharge to cease.

NERVOUSNESS.

In an address before the Charleston meeting of the Tri-State Medical Association CARROLL of Asheville, N. C., spoke on this topic and pointed out that more definitely than in any other branch of practice we must realize that we are "treating a sick person and not a sickness." No treatment which is directed to attacking separate symptoms is worthy the name. Too often it will be found that the handicap of heredity has been exaggerated by equally unwholesome environment. After organic disease has been eliminated, in kindness, charity, and patience, free from the attitude of superiority, and without irritation, the patient is to be shown his fundamental defects; to be promised help; to be directed by appealing to his reason, and not to his imagination as does the quack, and influenced to displace the unworthy motives of doubt and worry and the whole miserable list, by hope and faith, by calmness, by altruistic unselfishness, and by that Christly motive which softens and purifies, while it makes whole all hearts, termed in the Good Book "charity." There is an antidote in First Corinthians, thirteenth chapter, for all the ills of the neuropath. But First Corinthians was written many years ago, to many it is abstract, and the nervous patient reaches out for a concrete human hand. He is what he is in

spite of all the lessons which he inherited from the sages of all times, and it rests with the physician to see that when he asks for bread he is not given a stone.

One of the great responsibilities of our profession rests on the question of dosing nervous patients. Thousands of poor sufferers are to-day leading lives of the damned, because some doctor did not know that sedatives, opiates, and stimulants are seductive poisons, which only too rapidly hopelessly demoralize the already defective neuropathic character.

Without question the most powerful influence in helping the neuropath is the strong, rational, competent personality of the physician, who can give that sympathy which does not weaken. If we had as much confidence in our application of mental therapy as the quack expresses in his promises, or as we ourselves have been taught to have in the potency of our medicines, we could quickly relieve many a poor sufferer, by pointing out to him his defective mental attitude, and with wholesome counsel and patient encouragement show him that "work is cure." This is comparatively easy for many of the simpler cases. It is simply the substitution of a set of wholesome ideas in place of defective ones.

There remains a large class of neuropaths in whom damaging ideas and habits have become deeply fixed, and for whom the intermittent helpfulness of our visits or the office call is inadequate; patients who must be removed from the surroundings which have been the supposed reason for imperfect mental reaction. For such is the rest cure of Dr. Weir Mitchell, with its isolation, its forced feeding, and its weeks of rest, with the daily and hourly opportunity for physician and properly equipped nurse, to lead the patient steadily by kindly reason from the region of illogical thought and chaotic sensations to an understanding of his real weaknesses and defects. During these weeks the physician has every opportunity to scatter to the winds the phobias and obsessions connected with diet, dress, other habits and necessities, and substitute normal controlling ideas. During these

weeks the patient may be taught that through will and action the emotions may be mastered; that given a basis of reason, an opportunity for normal activity, and the will freed from the dictates of irrational ideas, his emotions may be controlled.

Here Carroll wishes to stress one point in which the Weir Mitchell rest cure has often proved inadequate. It is very well to inculcate these ideas; it is infinitely better to put the ideas into practice, so for years he has not accepted a patient for rest cure who has not been willing to follow the weeks of rest by an equal number of weeks of work. During the last two weeks of rest, by gradually increasing Swedish or resistive movements, the patient is prepared for rapidly lengthened walks to which are promptly added hours of out-of-door work. The walks include, if possible, hill climbing, and are taken regardless of the elements, in rain or sunshine, for the neuropath must learn to be superior to his surroundings, or he is not cured. The work is pushed to the point of daily fatigue. With male patients the weeks in bed are rarely needed, and the treatment may be started with mild muscular exercises at once. A few cases are so defective as to require firmness and the constant influence of the trained attendant. Carroll wishes to emphasize the inadequacy for many cases of the rest cure when not sustained by the confidence-giving, independence-declaring "work cure."

Carroll appends three maxims which are very helpful, and should be impressed on the mind of each neuropath: The first, "It is not my nerves, it is myself." The second from Dubois: "The nervous patient is on the path to recovery as soon as he has the conviction that he is going to be cured; he is cured on the day when he believes himself to be cured." The third is from that excellent little book, "Why Worry?" by Dr. Walton, and is truly a gem in the treatment of nervous breakdowns, "What I am doing is more important than how I am feeling."

So truly the treatment of nervousness is an educative measure, too serious to be trusted to the haphazard influence of hyp-

notism, or to be left in the hands of charlatans and quacks or to be given over to the cults and isms, which traduce all that is sacred for gain. It is a work with problems no more intricate than those met with daily by the internist, if we will but approach our trust with earnestness, with the strength which comes through self-mastery, and that confidence which is innate in those who follow duty.

SCOPOLAMINE-MORPHINE IN LABOR.

To the *Lancet* of December 9, 1916, JEFFERISS contributes a note upon two years' experience of the scopolamine-morphine method of inducing anesthesia in childbirth.

Jefferiss has used it in 64 cases, out of which number two were unsuccessful as regards anesthesia: one of these was a primipara, the other had one child. Both were robust, well-built young women. Of the 62 cases in which the anesthesia was perfect, 20 had some obstetric manipulation performed, and 18 of these had a final anesthesia with chloroform lasting from ten to twenty-five minutes. Two out of the 20 abnormal cases had the low application of forceps under scopolamine alone. In the 42 cases, the only anesthetic being scopolamine, both the mother and child were well. He has had no postpartum hemorrhage and no still-births in normal confinements. In the whole record of 64 cases he has had one still-birth; this is a primipara aged forty, delivered under chloroform, after over forty-eight hours under scopolamine, of a child weighing 12 pounds. This was one of the worst confinements that he has attended. Afterward she stated that she knew nothing about the whole period of labor from the first injection of scopolamine. In his practice he has had two still-births in cases in which chloroform was used only within the last two years.

As regards apnea in the infants, he has had no trouble in any of the normal cases. In two abnormal cases there was difficulty with the infant: one of these a long tedious labor of over twelve hours' duration in which forceps were applied, the other a case

of premature delivery at seven months. In this case he spent about half an hour before the child's respiration was satisfactory. In the same nursing home about the same time an infant was born at term without scopolamine and without chloroform which required the same amount of attention.

He has come to the following conclusions: That in normal cases this method is a boon to the mother and harmless to the child. That in abnormal cases extending over many hours scopolamine-morphine is just as useful. That one-sixth grain of morphine sulphate with the first dose is enough for a normal case unless there is great restlessness. The nearer the end of the first stage of labor that the treatment is started the better the result. Owing to rigidity, chloroform is advisable in any operative interference.

Jefferiss reports the following case as typical of a normal confinement under scopolamine-morphine anesthesia:

Mrs. —, aged twenty-four, primipara, was given the first injection at 5.30 P.M., as on examination the cervix was dilating and she, in her own words, "was only just beginning to realize actual pain." Previous to this she had been walking about and waiting for the labor to start. At 6.30 P.M. another injection of scopolamine was given. She began to doze about twenty minutes after the first injection, and was perfectly peaceful until, after five hours, she woke up and, again to quote her words, "felt quite refreshed, and found that the baby had been born two hours before, quite healthy and normal." She was perfectly quiet and felt no pain from beginning to end.

VALUE OF BLOOD-PRESSURE OBSERVATIONS MADE DURING SURGICAL PROCEDURES.

In the *Interstate Medical Journal* for October, 1916, Moors states that having made observations and records of the pressure in 98 per cent of his cases for the past eight years, he has, as a result of his experience alone, come to certain conclusions which he wishes to offer at this time.

1. The systolic pressure alone is of very slight if any value.

2. The diastolic pressure alone is of much more value than the systolic alone.

3. The pressure-ratio is the essential factor, and offers the earliest danger-signal.

5. There are certain elements in technique which have a marked and constant effect upon the pressures. These are as follows:

(a) The psychical or emotional state of the patient.

(b) The position of the patient upon the table, the extreme Trendelenburg being the worst.

(c) Overdosing by the anesthetist.

(d) The amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with scissors, the hands, and other dull instruments; the packing of large packs instead of rubber tissue into the abdominal cavity.

(e) The preservation of the fluids in the body up to the hour of operation, this being absolutely necessary to maintain the usual pressures.

ACUTE ANTERIOR POLIOMYELITIS TREATED SUCCESSFULLY BY TRANSFUSION OF CITRATED NORMAL BLOOD OF ADULTS.

In the *Medical Record* of September 30, 1916, RUECK gives results in three cases by this method.

The reasons for this treatment, which he used before the Board of Health began with the serum treatment, were the following:

1. Most healthy adults and children are immune to acute anterior poliomyelitis.

2. The blood of most people must contain antibodies, or it must at least be able to produce antibodies rapidly when the virus tries to invade the body.

3. If most normal adults and children did not have any protective elements in their blood they all would contract the disease in case of an epidemic.

4. The transfused blood reaches brain and spinal cord quickly by way of the blood current.

5. The transfused blood is a ready food for the tissues (the nerve cells included) and the sick organism does not have to use up its energy to elaborate this blood from the ordinary nourishment passing through the alimentary canal, and it can use this energy to fight the disease.

6. The method of transfusion of blood of adults seemed to Rueck superior to the method of injection of serum of convalescents into the spinal canal of sick children, as there must be different strains of the virus just as in epidemic cerebrospinal meningitis. And as Dr. Flexner's polyvalent serum of cerebrospinal meningitis is not curative in all cases of the disease for which it is made, so the serum of people having suffered with acute anterior poliomyelitis which contains antibodies for only one strain of the virus cannot be curative in all cases. Besides, we get in whole blood the action of the injected phagocytic cells.

7. People having been sick with acute anterior poliomyelitis are defective in some way or other. Naturally their whole blood or serum, the protective element against one strain of anterior poliomyelitis not counted, is inferior to that of normal adults.

8. Whole blood of adults is a protective agent and acts at the same time like a vaccine in most, if not in all, infectious diseases of children.

The firm belief in the curative action of normal blood in acute anterior poliomyelitis which caused Rueck to perform a transfusion on the three cases in the very beginning of this year's epidemic has been crowned with success.

He is only sorry that circumstances did not allow him to treat a greater number of cases. But the good results with normal blood serum which are obtained now in the Willard Parker Hospital, two months after Rueck's blood transfusions, confirm his statements concerning the curative action of normal adult blood. He considers normal human whole adult blood superior to sera. It is a remedy to cure acute anterior poliomyelitis when used early and to prevent it (he believes) when used before the onset of

the disease. Naturally it will be difficult to transfuse all children with blood in order to prevent a new outbreak of an epidemic of acute anterior poliomyelitis and of other infectious diseases of children, but whole human adult blood is in his opinion the remedy.

A STUDY OF TWO HUNDRED AND TWENTY-SIX CASES OF CHOREA.

In the *Journal of the American Medical Association* of November 4, 1916, LEVINSON reaches these conclusions:

1. The frequency of chorea in the cases was about 2.2 per cent of all children treated at the hospital.

2. The age incidence ranged from 3½ to 18 years. The ages of most frequent occurrence were between 5 and 14.

3. They found the ratio of females to males to be 2:1.

4. Season did not play a constant rôle in their cases. The greatest number were observed in December and January, the smallest number in October.

5. In their patients the relationship between rheumatism and chorea was not marked. Thirteen had a definite history of rheumatism; 130 had no history of rheumatism. They believe in the relationship between chorea and rheumatism, although their cases do not bear it out.

6. Tonsillitis was not a prominent factor. Sixty-six per cent of their cases had no history of tonsillitis.

7. In their series, infectious diseases were frequently found to precede the onset of chorea, but there seemed to be no close relationship between the infectious diseases and chorea.

8. Syphilitic manifestations were present in two of their cases. They seemed, however, to have no connection with the chorea.

9. Localization was frequent.

10. Endocarditis was frequent, though not a constant complication.

11. The mortality in their cases was a little less than one per cent.

12. The duration of the disease varied

from one day to more than a year. The average duration was from two to eight weeks.

13. Recurrences occurred thirty-five times. One patient had four, four had three, and twenty had two recurrences. The method of treatment had no direct bearing on recurrences.

14. For treatment they are strongly in favor of rest in bed and complete isolation, baths, and salicylates. They do not believe that arsenic has any special effect on the disease; if given in too large doses it may be pernicious.

THE SUSCEPTIBILITY OF MAN TO FOREIGN PROTEINS.

In the *American Journal of the Medical Sciences* for November, 1916, LONGCOPE prints a long article on this topic. He says it would be the greatest mistake and misfortune at the present time if anaphylaxis is allowed to have any bearing on the use of antitoxic and antibacterial sera. The concentrated diphtheria antitoxin, such as is employed, now rarely produces serum disease or sensitizes sufficiently highly to make a second dose, particularly if it is given subcutaneously, in the least dangerous, and it is only to the spontaneously sensitive who react to the first injection that harm is likely to come.

To prevent accidents in such unexpected instances, especially if large quantities of serum are given intravenously, a preliminary intracutaneous injection of 0.01 to 0.1 Cc. of serum should be made to determine whether or not the patient is spontaneously sensitive to the serum which is to be employed.

Though it would be interesting to recount the methods which have been employed to desensitize both artificially and spontaneously sensitized individuals, Longcope only points out the conditions which such methods must combat.

The injection of foreign proteins in man brings about the same condition of hypersensitiveness toward subsequent injections that it does in animals.

Certain individuals may show spontaneous hypersusceptibility to one of several foreign proteins. That these people differ from the artificially sensitized, in that their susceptibility is very great, is shown toward several different proteins, and has a tendency to occur in families. And, finally, that this state is associated with and directly responsible for some well-defined pathological conditions.

BENIGN PYLORIC STENOSIS AND ITS MANAGEMENT.

SMITHIES in the *Interstate Medical Journal* for October, 1916, asserts that except when lues is the etiologic factor any therapeutic course other than surgical is but palliative. Improvement upon limited or liquid diet frequently occurs, but such improvement is largely symptomatic; the stenosis remains and may become of greater degree. The possibility of malignancy supervening must be constantly borne in mind.

Palliative Treatment.—Gastric lavage, preferably performed at bedtime, prevents fermentation of stagnant food, night pain and vomiting, and exhaustion from chronic loss of sleep. Patients are readily taught to wash their own stomachs. Some prefer this type of relief to the hazard of laparotomy. A lavage fluid giving excellent results is warm Carlsbad water. (A drachm of artificial Carlsbad salts to a quart of water at about 30° C.). Lavage is quickly and thoroughly performed by the aid of the special tube which Smithies suggested several years ago. In cases in which there is marked hypersecretion, with excess of tough mucus and associated gastric atony, lavage may be needed both night and morning to insure the patient's comfort.

Diet.—Six to eight feedings daily of creamed vegetable soups, strained, or of well-cooked cereals or finely divided vegetables are generally well borne. Care must be taken to see that at least 2500 calories of food actually pass through the pylorus each twenty-four hours. If the pyloric stenosis is not of marked degree, soft eggs, custard,

jellies, or minced meats may be tolerated. Limitation should, however, be placed upon the proteid and fat ingestion.

Cases of mild stenosis with marked gastric irritability sometimes do well upon direct feeding into the duodenum by means of one of the commonly used tubes for the purpose. Duodenal feeding should not be carried on, however, simply because it is a novel and unusual type of alimentation. Very often duodenal tubes do not leave the stomach, and food injected through them enters the duodenum through the common channel.

If sufficient food cannot be tolerated by mouth, then rectal feeding should supplement oral nourishment. Smithies has found most satisfactory a nutrient solution composed of the following:

Glucose,
Alcohol (50 per cent), aa 30;
Sol. NaCl—(N), q. s. ad 240.

Such solution may be given several times daily by the drop method.

Medicinal.—Irritability of the stomach is best controlled by gastric lavage. Where there is marked peristaltic unrest, orthoform gr. x administered when the viscus is empty is often of much value. Bromides, atropine, and alkalis are frequently useful, particularly when such are combined with a proper dietary. The bowels may be kept open by morning doses of hot sodium phosphate solution, evening doses of petrolatum liquidum or appropriate enemata. The anemia may require iron and arsenic. Convenient ampoules for their painless hypodermic administration are available on the market.

COMPARISON OF THE RATE OF MULTIPLICATION OF BACTERIA IN RAW MILK WITH THE RATE IN PASTEURIZED MILK.

ALLEN in the *Journal of Infectious Diseases* for November, 1916, reports on a study of this subject and concludes that raw milk as compared with pasteurized milk exerts a powerful suppressing influence on the multiplication of certain bacteria.

When bacillus lactici-acidi is accustomed

to the milk of a certain cow, apparently no killing off of this organism takes place in freshly drawn milk.

When a single cell of certain pronouncedly chromogenic kinds of bacteria is added to fresh milk, the organism is found plentifully in the milk after sixteen hours at 20° C., the injurious action of freshly drawn milk not being sufficiently intense to kill the one bacterial cell.

After pasteurization the organisms which remain in the milk and those which are able to get into the milk find conditions more favorable for their rapid multiplication than before pasteurization.

THE TREATMENT OF CERTAIN DISEASES OF PROTOZOAL ORIGIN BY TARTAR EMETIC, ALONE AND IN COMBINATION.

CASTELLANI in the *British Medical Journal* of October 21, 1916, concludes that tartar emetic is of great efficiency in various protozoal diseases. Its powerful action in trypanosomiasis has been well proved, and it can be considered a specific in espundia, granuloma inguinale, kala-azar, and oriental sore. It is efficacious in yaws, especially if combined with other drugs, and seems to have a beneficial action also in relapsing fever.

THE TREATMENT OF ACUTE ARTICULAR RHEUMATISM.

HOGUE in the *Maryland Medical Journal* for November, 1916, in reporting cases treated by him thinks it is hardly necessary to dwell on the technique of administering this phylacogen, except to say that one should always use a sterile glass syringe. He believes pure alcohol is sufficient as a sterilizer, if for any reason one cannot boil his syringe. The site of the injection in adults is best made in the arms. Always give it subcutaneously, and never in a muscle. It may be given in a vein, but never give the initial dose that way. The subcutaneous and subareolar tissues seem to possess an unusual power of producing antibodies, while if the injection is made

into a muscle there is a great deal more pain, greater reaction, and probably a lessened antibody formation, as muscle tissue does not seem to possess the same power observed in the subcutaneous tissue. Intravenous injections are not only dangerous and do not possess any more, but may give a lessened antibody production; at the same time there is found an occasional case that will not respond to the subcutaneous injection, but will improve rapidly when the phylacogen is given into a vein. This is a fact well proven, but not understood. If you are dealing with an acute infection due to virulent germs, it is better to give a small dose first and repeat in twelve to twenty-four hours, gradually increasing the amount. In chronic conditions the initial dose should be larger and the interval between doses should be from two to six days.

ON THE RELIEF OF DYSMENORRHEA AND STERILITY BY THE INTRA-UTERINE STEM.

In the *Virginia Medical Semi-Monthly* of October 27, 1916, ROYSTER states that he wishes to relate, as briefly as possible, his experience with intrauterine stems in ante-flexion dysmenorrhea. This class constitutes by far the largest number which we are called upon to treat. They are either young girls clamoring for relief from excruciating pain or barren married women craving children. As a rule every known form of treatment has been tried before the patients are referred to the surgeon—and this is right. But if no improvement is manifested in three or four months, no further time should be wasted. Having established the probable diagnosis from the history and symptoms, Royster selects a day immediately following a menstrual period and examines the patient under ether, the only satisfactory way. If the uterus is anteflexed and no complications are found, the operation of dilatation (and in some instances curettage) is performed and a stem inserted. All this is done in the hospital operating-room under the strictest surgical technique. The patient remains in bed

about a week and may leave the hospital shortly afterward. During her stay much may be done to correct improper modes of living and unhygienic habits.

In every case he insists that the stem shall remain in place over three menstrual periods, or even longer, if necessary. The first succeeding period is generally as painful as before, but the second should be less painful, and the third almost or quite free from pain. If, however, the pain persists, the stem can be safely left for a longer time, until a painless period shall have occurred. Two months is the shortest time on his record and six months the longest. An exception is a patient who has just reported that the stem remained for nearly three years without harm. Most of us have been accustomed to dilate the canal, put in the stem, and let it stay for one or two weeks, the time that the patient is confined to her bed or room. The more Royster has had to do with these cases, the more he is convinced that the stem must be retained for a longer time; otherwise the treatment must often be repeated. Also it was formerly thought and taught that to allow the stem to remain as long as two or three months was dangerous; that a peritonitis might set up or mechanical injury might result. His experience has not confirmed this fear. In the discussion of Royster's paper nine years ago Dr. Leigh said that he had experimented with the view of determining how long it is safe to leave the stem in; that he had never found any trouble from leaving it in two and even three months. Royster was interested in this suggestion and has profited by it.

He has, therefore, confidently adopted the plan of keeping the stem in the uterus until the patient has passed three menstrual periods, the last of which is painless or nearly so. These patients must be kept under close observation by the surgeon or by the attending physician in order that the programme may be definitely carried through. Regulation of habits and attention to "nerves" must accompany the other treatment.

If the pain recurs some months after the

stem is out, it may again be introduced, perhaps without an anesthetic, after dilating the canal gradually with bougies. Leaving it in for another three months' period may bring the desired result.

Royster believes he has used all the well-known pessaries. In his hands the Wiley drain has been most often employed and the most successful. It is mechanically more perfect. It has a distinctly bulbous tip, so that, after passing the internal os, it does not come out as readily. It is somewhat straighter than the majority of the stems, and in most cases he heats it in boiling water to bend it perfectly straight.

In all surgical deformities we wish to overcorrect the condition. If we put in a stem the shape of the normal uterine canal, which is slightly anteflexed, we do not overcome the difficulty; but if we put in a straight instrument and make the canal conform to it, we get better results. The one valid objection to the Wiley drain is that its large flange at times exerts undue pressure on the posterior vaginal wall. In one case the flange became almost entirely embedded in the vaginal mucous membrane, but with no serious consequences.

He has replies from 59 cases treated during the past five years according to the plan outlined. Forty-eight of these have reported as being permanently relieved of their pain. In ten of the 48 the procedure had to be repeated. Of the eleven cases not relieved, five were improved and six showed no improvement. Cure of the sterility resulted in sixteen women who had been married without issue over periods varying from two to sixteen years at the time treatment was instituted. Of course these are included in the forty-eight reported as relieved, for the occurrence of pregnancy invariably cures this type of dysmenorrhea. The physiological method is the best, and it should be advised whenever possible.

It is to be noted, however, that the pain and the sterility are not always dependent on the same conditions. Other factors besides the anteflexion may operate in the production of sterility—the condition of the

uterine mucous membrane, the direction of the cervix, the secretions of the vagina, and the position of the uterus. It may, therefore, be less difficult to relieve dysmenorrhea than to cure sterility.

The records presented here would allow us to conclude that by the plan suggested nearly nine-tenths of the cases are relieved of pain and about one-third may be cured of sterility.

THE MODERN METHOD OF TREATMENT OF DISEASES OF THE STOMACH.

In the *Maryland Medical Journal* for November, 1916, FRIEDENWALD says that one cannot pass by the question of treatment of gastric disorders without at least alluding to a few facts regarding the surgical aspect of these conditions.

The newer surgery of the stomach was introduced with Billroth's successful pyloric resection for cancer, and Wölfler's gastroenterostomy in 1881. Since that time there has been a steady advance in the results of surgery, many so brilliant that operation has often been undertaken as a cure for all forms of indigestion; the results of which have often been dismal failures, increasing rather than relieving the patient's discomfort. Indiscriminate surgery has had a distinctly harmful effect in the advancement of surgery of the stomach. However, when the indications for surgical intervention are present, the results of surgery are most brilliant and gratifying.

The indications for operation on the stomach are as follows:

1. Obstructions, whether at the cardiac or pyloric orifices. Gastrostomy is indicated in impermeable strictures of the cardiac orifice or of the esophagus, and gives great relief until the stricture can be dilated; it prolongs life in cases of carcinoma of this region. Operation is always indicated in obstruction of the pylorus, whether the obstruction be due to simple pyloric stenosis or due to cancer. In cases of benign obstruction, the operations indicated are pyloroplasty, gastroenterostomy or py-

lorectomy; in malignant disease pylorotomy is indicated for cure and gastroenterostomy for relief.

2. Gastric ulcer. Simple uncomplicated gastric or duodenal ulcers do not require operation. Operation must only be considered when there are complications or when the ulcer has resisted a thorough medical cure.

The indications for operation are perforation, pyloric obstruction, and ulcers defying thorough medical cures. The surgical procedures which may be undertaken are excision of the ulcer, pylorotomy, pyloroplasty, or gastroenterostomy. The exact procedure to be followed must be determined by the surgeon at the time of the operation.

3. Gastric carcinoma. There is but one cure for cancer of the stomach, and that is operation. This can be accomplished only, however, when the diagnosis is made early. Inasmuch as early diagnosis is usually most difficult and often impossible, it is wise to urge upon all individuals over forty years of age who manifest symptoms of indigestion which are not relieved by a few weeks of treatment the need of a most critical examination, and if the diagnosis still remains doubtful, of exploratory incision. It is by this method alone that cases of carcinoma of the stomach can be determined early, and at that stage when cure is still possible; otherwise the operation can only be in the nature of relief—gastroenterostomy for relief of obstruction—but not of cure.

THE TREATMENT OF OBESITY BY A RATIONAL DIET.

CORNWALL in the *Boston Medical and Surgical Journal* of October 26, 1916, states that in the treatment of obesity the object aimed at is the combustion of a definite amount of surplus fat in the body, and the prevention of its reaccumulation. Regulation of the diet constitutes the essential part of this treatment.

It would be an easy matter to calculate the formula for reducing the fuel value of the food intake, if oxidation in the body

were always regular and uniform. In such case the amount of reduction would have a caloric value equal to that of the quantity of body fat which it is desired to burn up. For example, if the reduction in weight desired is at the rate of two pounds a week, which means the combustion daily of about four and a half ounces of body fat, the fuel value of the daily ration would have to be reduced about 1000 calories below the normal for size, age, and activity. But the oxidation of fat in the body is not always regular and uniform, and does not always respond promptly and fully to the demands made on it by partial starvation. Extensive variation of this oxidation in different individuals is a matter of common observation; frequently small eaters are seen to remain persistently stout, while large eaters as persistently remain thin. Nevertheless, the formula suggested serves as a basis on which to work out the best formula for the individual case.

Measures to improve oxidation in the body are called for in the treatment of obesity; and as all metabolic processes are more or less under control of the internal secretions, such measures are directed very properly toward improving the condition or action of the glands which produce these secretions. This means, as regards diet, regulation of the quality as well as quantity of the food, so as to diminish, in particular, the toxemias of alimentary origin which could injure those glands or disturb their functions. This is effected mainly by restriction or exclusion of articles of food of animal origin excepting milk and its products.

The following practical suggestions for regulating the diet in obesity seem in harmony with the facts and principles above alluded to:

Bear in mind that regulation of the diet is the principal thing in the treatment of obesity, and that this regulation should be qualitative as well as quantitative.

Insist on scales and measures being used to secure accuracy in carrying out the dietetic prescriptions.

Do not rely for protein chiefly on animal

tissues and eggs, as is done in most obesity diets, but secure protein chiefly from milk and its products, which supply all the different amino acids needed by the body and are relatively easy of metabolism, being free from purins and comparatively insusceptible to putrefactive processes in the alimentary canal. If no other morbid condition is obviously present, a small amount of animal tissues or eggs may be included in the diet; but in cases complicated by obvious insufficiency of nitrogenous metabolism (as shown by gout, gravel, migraine, arteriosclerosis, chronic nephritis, or hepatic insufficiency), or by disease of the alimentary canal, which increases the habitual production in that canal of putrefactive poisons and their absorption therefrom, the amount of flesh and eggs should be very small indeed or they should be excluded altogether. Such qualitative regulation of the protein ration for the special purpose of easing the burden of nitrogenous metabolism, is a cardinal principle in this method of treating obesity and its distinguishing feature.

Include plenty of fresh fruit and vegetables in the diet, in order to supply full rations of the body salts and vitamins; but use careful selection, so as to include only fruits and vegetables which are comparatively free from objectionable qualities, such as indigestibility, possession of purin or oxalic acid content, and offensiveness to the patient's idiosyncrasies.

Allow water to be drunk in ordinary quantities.

Begin the treatment by restricting the fuel ration so as to supply 1000 calories less than the minimum health ration for the particular patient.

Do not reduce the quantity of protein much below the minimum health ration, but let the loss fall chiefly on the fat and carbohydrate.

Do not, as a rule, try to reduce the weight by more than two pounds a week, on the average. Such a moderate reduction is not often attended with any unpleasant consequences.

Bear in mind the exceptions which exist in regard to reducing weight: Be cautious

in reducing the weight of those afflicted with serious diseases; relax the rigidity of the diet or discontinue all attempts at reduction, if in the course of treatment symptoms of distress or weakness appear (which does not often happen with this plan of treatment); and do not, as a rule, attempt to reduce the weight of those entering on old age who have been obese for a considerable time.

In most cases allow occasional periods of rest from the rigid diet, and while giving the minimum health rations, take note if the weight increases in consequence.

RECTAL ANESTHESIA.

JOHNSON in the *New York Medical Journal* of October 28, 1916, states that in the hospital with which he is connected he has supervised over fifty cases of oil-ether anesthesia, with absolutely no untoward effects. Most of these cases were on the service of Dr. Bainbridge. In comparing these cases with the other methods, namely, the vapor and drop methods, lung irritation, postoperative nausea, and vomiting seemed less. Fright and mental shock were certainly much less. The method is liked by the patients. He has repeatedly had them say, on return from the operating-room and to consciousness, "When will I be operated on?" More than once, in extremely nervous patients, who particularly dreaded the anesthesia, he has had the oil-ether mixture administered without their knowledge, they thinking they were getting only a bowel irrigation. They would go off into surgical narcosis, be taken to the operating-room and returned, with no knowledge of what had occurred. This eliminates the ordeal of the patient sometimes facing the surgeon and assistant, with the gruesome appearance of the operating-room, and the much-dreaded ether mask; thereby abolishing fright and mental shock. The method thus carried out would seem to obviate the necessity of nerve blocking, or Crile's anociassociation, in general anesthesia.

The patients are prepared as for vapor

anesthesia, with the exception that the rectum must be absolutely free and clean—in other words, in the best possible condition to absorb the mixture. It is his custom to order a cathartic dose of castor oil at 2 P.M. on the day before the operation. At night the patient has (after the oil has acted) colon irrigation until the water returns clear. In the morning one or two colon irrigations are given, until the water returns clear. Two hours before the operation, five to fifteen grains of chloretone is given per os; thirty minutes before the regular anesthetic is given the following is administered:

Paraldehyde, 2 to 3 drachms;
Olive oil, 2 ounces;
Ether, 3 to 4 ounces.

This is given by a competent nurse, and allowed to flow very slowly, about one ounce escaping each minute, having the patient in the Sims position. It is important to have the patient in a dark room, and free from noise, such as loud talking, etc. If in a ward, the bed should be screened. At this time the patient also receives one-sixth to one-quarter grain of morphine, together with 1/150 grain of atropine subcutaneously, remembering that hyoscine, grain 1/200, in addition to the morphine, acts better with alcoholics. These agents are synergistic and should always be chosen according to their indication. The patient must not be disturbed in any way until surgically unconscious (regardless of the surgeon's hurry), which will require from fifteen to thirty minutes. After about four minutes the odor of ether will be noted on the patient's breath. The ether does not separate from the oil until warmed and vaporized by body temperature, when it is taken up by the intestinal mucosa, through the hemorrhoidal veins, transmitted to the liver, thence to the heart, and finally to the lungs. The absorption by this method is slow and uniform, the patient absorbing about two ounces an hour, less than by any other method save the intravenous, which is about one and one-half ounces an hour. The vapor and drop method are variously estimated at from three to six ounces an

hour. The dose is determined by the age, weight, and habits of the patient, about one ounce of ether being required for each twenty-five to thirty pounds body weight. When paraldehyde is used, this may be lessened, but the author says they never give over six ounces of a 75-per-cent oil-ether mixture to adults, regardless of weight. Children require only from 50 to 60 per cent of ether, and when below nine years of age no preliminary treatment.

This method differs somewhat from the respiratory, inasmuch as the ocular reflexes should never be abolished, **neither** should stertorous breathing be allowed to continue. These are danger-signals! If they occur the indication is to withdraw from one to two ounces, or all of the mixture, massage the bowel from left to right immediately over the transverse colon, and irrigate with cold water. If the patient seems to be coming out, keep mouth and nose covered, when he will rebreathe and quickly go back into a smooth, easy surgical narcosis. If the patient is getting too much, the nose and face may be left uncovered. The tongue and jaw should be carefully watched in this, as in any other general anesthesia. At completion of operation the colon should be irrigated, the transverse colon being massaged from left to right. This may be accomplished through rectal tubes, which have been left in place but clamped off, while dressings are being applied, and before the patient is removed from the operating table.

The advantages of this method are the safety and ease of administration, without complicated apparatus, the only things required being a rectal tube, with funnel, and a Gwathmey irrigating tube. It is specially indicated in all operations on the head, throat or chest, the obese alcoholic, and aged patients on account of lessening bronchial irritation. Contraindications are any disease of the intestines, operations on the pelvis, and in general laparotomies, on account of gaseous distention. However, with competent assistants to hold back the intestines, this may be accomplished, and not a few celiotomies are being performed

under this method of narcosis. When the method is better understood, it will be the one of choice in suitable cases.

[We think that few will care to give large doses of chloretone, paraldehyde, morphine, atropine, and finally ether to induce anesthesia.—ED.]

ARTERIAL HYPERTENSION AND ITS MANAGEMENT.

STOLL in the *Medical Record* of October 28, 1916, says we may roughly divide our patients with hypertension into two classes: The first comprising the individuals who come to our office, as their symptoms are not sufficiently urgent to make them give up work. The other group comprises those in whom the disease is further advanced and who are seen at their homes or in the hospital.

In the first group it is particularly important to study each case thoroughly in order that we may ascertain what the incidental factor of the hypertension is. It may be prolonged mental application without adequate periods of relaxation; it may be too many cigars, or it may be too long hours and a general unhygienic régime under which the patient lives.

Inquiry as to his habits should always be very thorough, as a readjustment of his life is necessary, but it should be brought about with the least possible violence. To tell an active business man with moderate hypertension that he must immediately give up all his business is speaking thoughtlessly and unwisely. He will not take kindly to crocheting, neither will he sit under a tree and write sonnets. With care, however, his habits can usually be rearranged so that a great deal of strain is taken off of his arteries.

The "noon hour" should be multiplied by two. After the midday meal, which should be the chief meal, rest in a recumbent position for an hour is desirable. If the patient can sleep a part of that time so much the better.

If the physician explains to an intelligent patient that as the arteries lose their elas-

ticity and their lumen diminishes the blood-pressure must of necessity rise to maintain the circulatory balance, he will materially lessen the anxiety that the term high blood-pressure occasions. If the physician further explains the incidental factor of arterial tension and enumerates its chief causes he will readily obtain his patient's coöperation, which is so essential in the management of these cases.

The hypertensive individual must first of all stop "hustling." He must school himself to say "There will be another car in a few minutes" when he is late at breakfast. If he must climb stairs, deliberation should characterize the act. If he be a really remarkable man he may learn to control his temper, for there are few things more injurious to diseased arteries than bursts of anger.

The individual with but slight degree of hypertension, free from morning headaches, and who is eliminating a good amount of phthalein in two hours (50 per cent or over), should not be put on a milk diet nor told to give up all meat. A moderate amount once a day is desirable.

It has long been known that overeating is distinctly harmful, and it is particularly so in this class of patients. The heaviest meal had best be taken at midday and the supper be simple. The importance of complete relaxation one or two days of each week cannot be overestimated, as fatigue is cumulative. It is important that the patient take several warm baths each week, have a daily evacuation of the bowels, and a cathartic once or twice a week, but too active catharsis will be followed by faintness and weakness.

One cannot deduce that because the urine contains no albumin the integrity of the kidney has been preserved. When the amount of urine passed during the night exceeds the amount voided during the day, and when the gravity is persistently low or "fixed," one must conclude interstitial changes have already begun. The phenolphthalein kidney function test is the only one of the function tests that can be readily performed by the general practitioner, and

it corresponds quite accurately with the more complicated estimations of the non-protein nitrogen in the blood.

It is important, however, to appreciate that the amount of phthalein eliminated at any time is an estimate of the kidneys' ability to excrete that drug only at that particular time, and does not *per se* warrant an absolutely favorable or unfavorable prognosis. The kidneys may improve or the trouble may extend within the next few weeks. It is desirable in all cases of hypertension to ascertain from time to time how the kidneys are functioning, as occasionally the diminution in function may precede serious symptoms.

During the winter months hypertensive patients should avoid all unnecessary exposure, as even a mild infection may result disastrously.

Vasodilating drugs are not usually called for and are often harmful. In certain cases they will unquestionably relieve symptoms, but their routine employment as soon as the patient comes under observation should be discouraged. When the tension is very high a prompt venesection may be live-saving.

Stoll has frequently obtained marked relief from sleeplessness, nervousness, and headaches by the use of potassium iodide and mercury either by injections or inunctions, though the Wassermann test was negative.

In the second class of individuals, where the kidney and heart are not long able to adequately do their work, the patient must be in bed.

Digitalis is nearly always required irrespective of the blood-pressure, and fears of a higher tension resulting are groundless. Not infrequently a combination of potassium iodide and digitalis will give results not obtainable with either used alone. A low phthalein output and an increase in blood nitrogen regularly accompany this stage of the disease, and the diet should be low in protein and sodium chloride.

If the patient be very edematous only 800 Cc. of milk in twenty-four hours should be allowed (Karrel diet). This has the advan-

tage of being low in protein and sodium chloride.

When compensation is reestablished carefully regulated exercises are to be instituted.

The distressing dyspnea that so often attends the final days of hypertensive patients can be controlled only by morphine. The temporary improvement from a good night's sleep following its use is often very gratifying, and it should not be withheld when the end is near.

THE MECHANISM OF THE PROTECTION AFFORDED BY THE DRAINAGE OF PROSTATICS AS A PRELIMINARY TO OPERATION.

CABOT and CRABTREE (*Boston Medical and Surgical Journal*, Nov. 2, 1916) state that no discussion is necessary to establish the now generally accepted view that the custom of preliminary drainage before operations for prostatic obstruction has been an important factor in reducing the mortality. Much obscurity, however, surrounds the reasons for the benefit thus produced, and it is with this subject that the writers are concerned. The importance of preliminary drainage is by no means equal in the various classes of cases presenting themselves for operation. It will probably be generally admitted that preliminary treatment, of which drainage is the most important constituent, is most essential in the class which comes to us with the largely over-distended bladder, sometimes stretched to the point of overflow, but in whom infection has not yet occurred. We all of us remember the dreadful mortality which accompanied the attempt to empty the bladder and remove the obstruction immediately upon coming under observation. It is notorious that these cases did badly from the start, and died generally with the symptom-complex which we somewhat loosely call uremia. Perhaps the next most lethal proceeding was to operate at once upon those cases with a moderate residual of from 6 to 12 ounces and a still uninfected urine, while immediate operation was least hazardous in

those cases with a moderate residual thoroughly infected, and best typified by the patients who had for some time been leading the so-called catheter life. The extremes are represented by the overdiluted uninfected bladder and the thoroughly infected but regularly emptied bladder enjoying a catheter life.

We shall perhaps approach the question in the most orderly fashion if we inquire what benefits are produced by the preliminary drainage which we now institute, and why these benefits accrue. The effects appear to be the result of two factors: (1) Relief of the so-called "back pressure," with the equalization of the kidney circulation thus resulting; and (2) infection which, though long believed to be chiefly a cystitis, is now generally regarded as in fact a pyelonephritis. This infection is not absolutely inevitable, and there are doubtless a certain number of cases in which, under the methods ordinarily employed, the process of emptying the bladder and restoring the equilibrium of the kidney is carried through without infection. This is certainly the exception, not the rule, and we should be chiefly concerned with the majority of cases in which infection of a more or less serious degree occurs. Infection is most difficult to avoid in the cases with overdiluted, uninfected bladders, and the probability of infection is increased rather than diminished by the presence of the indwelling catheter. The patients in whom it is most frequently possible to avoid infection are probably those with a moderate residual, still uninfected, whose urethrae are readily passable to instruments, and who can therefore be managed by the process of intermittent catheterization.

The relief of back pressure upon the kidney and the infection of the kidney, which so commonly accompanies this process, will both affect the kidney function, and as kidney function is the most accurate measure of the margin of safety which these patients enjoy, we can most safely estimate the effect of these conditions upon the patient's health by studying its effect upon his renal function. For the purpose of studying the

changes in kidney function the authors have employed the phthalein test, and, though recognizing its limitations, continue to regard it as on the whole the most useful measure of kidney function. Lumping together for the moment all the cases with residual urine treated by drainage, whether that residual be large or small, infected or uninfected, drainage produces, generally speaking, a drop in function, an intermediate period in which function remains more or less low, and a return frequently to a point somewhat below the original level, but sometimes equaling or even exceeding it. The greatest fall in function is to be expected in the cases of recently overdiluted, uninfected bladders, while the least reaction is undoubtedly seen in the cases with a moderate infected residual. The very great drops occasionally seen in patients with overdiluted, uninfected bladders, they believe to be due to a composite process, part of the drop being due to the relief of pressure, with consequent acute congestion of the kidney, and another perhaps equal amount due to acute pyelonephritis.

It is possible to see why the greatest drop should occur in the overdiluted, uninfected bladder, and why there may be little or none in the moderately distended infected. In the former case, two factors, both tending to reduce kidney function, become operative at somewhere near the same time, the congested kidney with diminished function being further submerged by the intercurrent of a pyelonephritis. On the other hand, the patient with an already infected urinary tract is exposed only to the drop of function resulting from what one may call decompression. He is protected from an intercurrent pyelonephritis by the immunity which he has established as the result of a previous infection. This accounts for the better results of emergency operations upon patients leading a catheter life.

We are now in a position to estimate the causes operating through the kidney to produce the high mortality before the days of preliminary drainage. In the worse cases (the overdiluted, uninfected) these pa-

tients were asked to survive three more or less lethal assaults, all of them operating to depress kidney function and attacking them at substantially the same time, namely, decompression congestion, operation, and pyelonephritis, with no previously established immunity. Drainage has had the effect of separating these three factors in point of time so that the decompression comes first, the pyelonephritis comes second, and these two being survived, the operation comes third. This not only has the eminently desirable result of enabling a considerably larger number of patients to survive, but the also not undesirable corollary that should the patient fail to survive the first two catastrophes, he is not added to the burden of the statistics-worshipping surgeon.

The decompression congestion can hardly be avoided, at least to some degree; the details of the operation have commanded the attention of the most eminent; but the important kidney infection has been too much regarded as an unavoidable catastrophe. The term pyelitis has been loosely applied to a group of cases whose chief symptoms are bladder irritation, pus in the urine, fever, and varying degrees of costovertebral tenderness. This picture is practically always produced by infections with the colon bacillus, though it may possibly be produced by other organisms.

The striking fact about these cases of pyelonephritis is the amount of the effect on the kidney function as compared with the apparent lesion. In fact they are likely to be passed by the pathologist as substantially normal unless a careful study be made of the tubular area. This discrepancy may be explained by the fact that the phthalein excretion is perhaps carried on chiefly by the convoluted tubules, and that a comparatively mild lesion of this area will have relatively striking functional effects. The authors draw attention to the fact that the permanent lesion, where such occurs, is chiefly in the renal pelvis, where, in persistent cases, a chronic catarrhal pyelitis remains, giving rise to persistent bacilluria and being the source from which recurrent

invasions of the kidney, chiefly in its interstitial portions, occur.

As tending to show that these infections are of hematogenous origin, they submit the evidence already reported by one of them that blood cultures in these patients with prostatic obstruction on constant drainage are positive for the colon bacillus in a proportion of cases about equal to that occurring in typhoid fever, in which the infection is admitted to be of hematogenous origin. It is further to be noted that positive cultures are much more likely to be obtained when the blood is taken at the onset of the attack, and that cultures taken at a subsequent period are more likely to be negative.

The chief benefit resulting from preliminary drainage in these cases is the immunity to pyelonephritis as a complication of the operation, which immunity is conveyed by the pyelonephritis resulting from drainage. In a word, the chief benefit of drainage to the patient is infection, not because the infection is desirable but because the immunity which therefrom results gives him a security which it has not been possible to obtain in any other way. That this immunity is of short duration seems probable from the fact that patients with a chronic pyelonephritis notably suffer from relapses of the nephritic element at longer or shorter intervals.

If now it is believed that the contention on this point is of substantial soundness the foundation has been laid for the understanding of the further proposition, namely, that it may be possible to produce immunity to pyelonephritis in these patients by a method less violent than the actual production of the disease. It has been amply demonstrated that a considerable degree of immunity to the typhoid bacillus can be produced by what is known as vaccination. The relation between the typhoid and the colon bacillus is one of reasonable kinship, and it is therefore at least arguable that they may behave in a somewhat similar fashion. That the problem is far more complicated when dealing with the colon bacillus must be admitted at the outset, since the family of colon bacillus is a nu-

merous tribe. On the other hand, it has already been shown that immunity to certain strains of the colon bacillus can be produced both in man and in animals.

The authors wish to be clearly understood as presenting this only as the beginning of a piece of work which appears to be based upon sound premises, and draw attention to it at this time in order that the efforts of others may supplement their own endeavor, should it seem worthy of further consideration. That intercurrent pyelonephritis is for the prostatic a serious catastrophe seems to them clear; that it is in some ways a protective mechanism is at least a reasonable contention. If this protection can be established by the production of artificial immunity, a considerable advance will have been made toward eliminating an important factor in the mortality of operative procedures for the relief of prostatic obstruction.

FUNCTIONAL KIDNEY TESTS.

LOHMAN and MOORE (*Long Island Medical Journal*, September, 1916) justly observe that the business of the kidney is to eliminate from the body water, nitrogenous waste bodies, such as urea, uric acid, creatin, etc., and inorganic salts, principally sodium chloride.

This is accomplished partly by mechanical filtration and partly by the secretory power of the cells of the capillaries and of Bowman's capsule; later by the secretory action of the tubular epithelium, the kidneys also having the power to reabsorb water and some of the dissolved substances from the tubes.

The glomeruli are mainly mechanical filters and pass on to the tubules an alkaline fluid which contains urea, chlorides, phosphates, sulphates, and sometimes sugar. The tubules change this alkaline, glomerular fluid to acid and add to it by excretion, urea, uric acid, phosphates, and sometimes water, and, finally, concentrate this fluid by the absorption of water. Also they have the power of differential reabsorption of certain salts, especially sodium chloride.

The renal secretion depends upon the rate of blood flow and ceases at the systolic pressure of 40 mm. Nerve disturbance acts by its influence on the circulation.

Experimentally the pathological physiology of the kidneys has been studied by means of irritation incident to the use of uranium nitrate, bichloride of mercury, and chromium, which affect the tubules; arsenic and cantharides, which affect the glomeruli; and diphtheria antitoxin, which affects both.

All of these forms of experimental nephritis are acute. To produce chronic forms, metals are administered in small repeated doses, principally uranium nitrate.

The edema of nephritis may be due to a number of factors. In hemorrhagic nephritis it may be due to anemia. It may be cardiac, as in chronic interstitial or cardiac nephritis. It may be renal, as in acute and chronic parenchymatous nephritis. Its causes are unknown. Water retention, chloride retention, vascular injury, and changes in the blood are important elements in its production.

Increased blood-pressure occurs mostly in the glomerular and interstitial forms of nephritis. It is due to arterial contraction. It must be in part functional. The heart hypertrophy results from high tension and may appear in three or four weeks.

Uremia is an intoxication due to more than one toxic agent. The greater the nitrogen retention of the blood the greater the danger of uremia.

Tests for renal function fall into three general groups, depending on the ability of the kidney to excrete from the circulation abnormal substances, such as dyes or drugs, which are introduced into it; analysis of the products of metabolism retained in the blood as a result of faulty elimination by the kidney; abnormalities in the physical and chemical properties of the urine.

The number of tests that has been used is legion:

Under the first group we have phenol-sulphonephthalein, methylene blue, indigo-carmin, rosaniline, potassium iodide, lactose, salicylates, sugar following phloridzin, and the enzyme diastase.

Under the second group blood urea, total non-protein nitrogen in blood, cryoscopy or lowered freezing point of blood, cholesterin, creatinin, and uric acid.

Under the third group we have variations in specific gravity; water, sodium chloride and nitrogen output and their relation to intake; and, in addition, the usual examination for albumin and casts.

Many of the tests mentioned are of uncertain value, and others have been discarded because of difficulties in technique. In their work Lohman and Moore have made use of the following general scheme:

The patient is placed upon a standard diet. A record of fluid intake and output is carefully kept. The specific gravity and output of chlorides and nitrogen in the urine are ascertained. The amount of blood urea or total non-protein nitrogen in blood is determined and a phthalein test done. Subsequently a measured amount of salt (10 grammes) is added to the diet, and the ability to excrete this added salt is noted.

The test of renal response to water may be made by comparing the amount of fluid ingested to the amount eliminated in the same period. Normally there are wide variations due to atmospheric temperature, sweating, diarrhea, etc., but the amount of urine passed should roughly be equal to the amount of water taken in the diet as fluids, usually 1000 to 1500 Cc. per day.

The average normal daily salt output is 10 to 15 grammes.

Added sodium chloride is eliminated normally in two ways: First, by drinking more water, the added sodium is eliminated without increasing the percentage of salt in the urine. Second, the added sodium chloride is eliminated in a highly concentrated solution without the ingestion of more water. In this case, however, the elimination may be slightly delayed. With diseased tubules, according to Schlager, the elimination of sodium chloride is much delayed, even when much water is added. Normally, the 10 grammes or more of added salt should be put out in twenty-four hours.

Phenolsulphonephthalein is a bright-red

crystalline powder somewhat soluble in water and alcohol, but readily soluble in the presence of alkalies. For the test 6 milligrammes of the powder are used in 1 Cc. of solution. This amount is injected into the lumbar muscles after the patient has emptied his bladder. He is then instructed to drink two glasses of water. After one hour and ten minutes the first specimen of urine is collected; and second and third specimens are collected at one-hour intervals. Enough 25-per-cent sodium hydroxide solution is added to each specimen to make the urine decidedly alkaline in order to bring out the maximum reddish color. The specimen is diluted up to 1000 Cc. with water, shaken up, and a small quantity is filtered and used in the colorimeter to compare with the standard, which is an alkaline solution containing 6 milligrammes to the liter. The percentage on the scale is then read. In health the elimination is almost complete in two hours. In the first hour 40 to 60 per cent should appear; 60 to 85 for the two hours.

Folin and Denis, working with exceptionally healthy subjects, found the total non-protein nitrogen in the blood to vary from 22 to 26 mg. per 100 Cc. of blood, and the urea nitrogen from 11 to 13 mg. per 100 Cc. This is too narrow a standard for patients. For practical purposes we may accept the standard set by Janeway, that the total non-protein nitrogen should not exceed 40 mg.

Recently Herman Mosenthal, of Baltimore, has given a modification of the Hedinger and Schlager method of estimating renal function. He measures the specific gravity, salt, water, and nitrogen output in two-hourly periods during the day, and the total nightly output, when the patient is on a so-called "nephritic test diet." Mosenthal's diet contains measured amounts of food for breakfast, dinner, and supper, and totals for the day 13.4 gms. of nitrogen, 8.5 gms. of sodium chloride and 1760 Cc. of fluid, with a considerable amount of purin in the meat, soup, tea, and coffee. The quantities refused by the patient should be noted, and allowance must be made in cal-

culating the food intake. No fluid or solid is allowed between meals or at the food intake or at night. In examining the urine the volume of each two-hourly specimen is measured and the specific gravity is determined. The points to be noted are:

The characteristics of the day urine.

The total quantity of salt, water, and nitrogen excreted in twenty-four hours.

The characteristics of the night urine.

In response to this diet normally the day urine shows fluctuations in the specific gravity readings, equal balance of salt, nitrogen, and fluids.

The night urine shows a comparatively small quantity (about 400 Cc.); the specific gravity is high and the nitrogen per cent is high.

A diseased kidney shows its diminished power to functionate by a fixation of its concentration, while in a normal kidney the specific gravity is high or low, according to the demands made by the fluids and solids ingested. The power to excrete a more dilute urine is lost, as well as the power to concentrate.

In nephritis there are two types of abnormal secretion in day urine:

Salt retention with normal nitrogen elimination in chronic parenchymatous nephritis.

Diminished salt and nitrogen elimination in primary and secondary contracted kidney.

The night urine in nephritis: Nycturia has long been recognized as a valuable sign in nephritis. Mosenthal found that it is often the earliest sign of nephritis. Besides nycturia, the night urine shows low specific gravity and low nitrogen per cent.

His results, then, in the two chief (?) types of chronic nephritis are: In chronic interstitial, fixed and low specific gravity, diminished salt and nitrogen excretion, polyuria, as determined by twenty-four-hour measurement of volume, increased volume at night. In the chronic diffuse or parenchymatous type the findings are more variable. When there is edema, there is salt and water retention, nycturia, or increased volume at night, and normal nitrogen output. With edema disappearing, water and

salt are excreted in about the normal amount, and nycturia is marked.

In renal congestion from myocardial insufficiency we have specific gravity fixed, about 1020, salt output diminished, normal nitrogen, oliguria, and normal night urine.

In considering the diagnostic value of the various functional tests it will be noted that there are certain essential differences in the character of the information obtained from each.

The phthalein test, for instance, is a test of present renal function. In other words, it is a measure of the ability of the kidney to excrete this dye from the blood at the immediate time when the test is made.

The tests for retained substances—that is, blood urea, and total non-protein nitrogen in the blood—on the other hand, are a measure of the accumulation in the blood of waste products which should be eliminated by the kidneys. Where the blood urea or total non-protein nitrogen is high, it shows that diminished renal function was present during a certain period of time while these substances accumulated.

This is of diagnostic importance; for instance, in a case of acute myocardial insufficiency without serious kidney damage, the phthalein excretion, due to passive congestion of the kidneys, may be low, but the urea or total non-protein nitrogen of blood is little, if any, increased above the normal. As the circulation improves the phthalein excretion rapidly rises until, when compensation is completely restored, it reaches the normal.

If, however, in addition to the cardiac insufficiency, there is a complicating chronic nephritis, not only will the phthalein excretion be very low, but the blood urea and total non-protein nitrogen will also show a marked increase, and if compensation is reestablished the phthalein test, although it may, and usually does, improve somewhat, will never reach normal limits. The non-protein nitrogen remains unchanged.

Experience with functional tests has become sufficiently great so that we may now safely use them in prognosis. Generally

speaking, we may say that the more advanced the disease the greater will be the disturbance of function as shown by the various tests. The more widely they deviate from the normal, the graver the prognosis. Repeating tests at intervals makes it possible to follow the progress of the disease. Whether function is returning to normal, remaining stationary, or diminishing, can be determined. This is particularly true of the phthalein test. The observations and recorded figures of many investigators prove that the degree of renal disease is closely paralleled by the ability of the kidney to excrete this dye, thus confirming Rowntree and Geraghty's original communications.

There is one important exception to this rule, namely, the passive congestion of cardiac insufficiency. Here the phthalein output may be very low, but it rapidly increases as the circulation improves.

Repeated phthalein tests showing a progressively lower output indicate a progressive lesion and a bad prognosis.

Very low excretion of phthalein, say under 20 per cent in two hours, always justifies a grave prognosis, except in those cases of surgical nephritis following mechanical obstruction of the urinary passages. Here surprising improvement often follows removal of the obstruction.

Uremia is almost always ushered in by a complete suppression of phthalein excretion or just faint traces in several hours. Impending uremia can frequently be foretold before the onset of any clinical symptoms by this marked absence of the kidney's ability to put out phthalein.

The figures published by Thayer and Snowden are worthy of quotation, as all their cases were confirmed by autopsy. These were all cases of chronic nephritis: 20 per cent or over in two hours; 9 tests, 6 cases, longest survival eight months. Ten to 20 per cent in two hours; 6 tests, 6 cases, longest survival four months. Under 10 per cent in two hours; 16 tests, 12 cases, longest survival 72 days. Trace only; 7 tests, 4 cases, longest survival five days.

The prognostic value of the tests for

retained urea or non-protein nitrogen is also great, although it has not been as accurately determined as the phthalein.

In the majority of cases the nitrogen of the blood increases with increasingly severe nephritis, so that the degree of accumulation affords valuable information in regard to prognosis.

Frothingham, Fritz, Folin, and Denis showed in experimental uraemia nephritis in rabbits the relationship between the extent of the disease, the excretion of phthalein, and retention of non-protein nitrogen in blood. The two tests paralleled each other, except that the phthalein excretion in the urine dropped rapidly to its lowest point and returned rapidly to normal with recovery of the kidney, whereas the non-protein nitrogen in blood accumulated more gradually and returned to normal more gradually. Hence in the latter test the duration of the disease is an important factor.

Very high values, say over 100 mg., are of grave significance and often suggest danger of impending uremia.

Cases in which the blood urea or the non-protein nitrogen increases while the patient is on a low protein diet do badly.

In cases of myocardial insufficiency the presence of high blood nitrogen makes the prognosis much worse, as it indicates the presence of serious kidney damage.

Salt and water retention is of less importance in prognosis than the foregoing tests. There is one rather rare type of nephritis first described by Pepper and Austin, characterized by marked edema, in which the retention of salt and water is very pronounced, and in which the other tests may be little, if any, changed from normal. Here the degree of retention would be an indication of the severity of the disease.

To a certain extent, at least, the functional tests offer a more accurate and rational basis for treatment than can be obtained by the usual clinical observations alone.

Salt and water retention indicates a diet poor in salt and water, as was first taught

by Widal. The value of this procedure is well recognized.

The treatment of nitrogen retention is by no means so satisfactory, although marked retention calls for a low proteid diet, 20 to 30 grammes per day. But it has been shown by Chittenden and others that the body requires from 40 to 50 grammes of proteid daily to make up for the tissue waste. If less than this amount is given for long periods, gradual starvation will result. Frothingham and Smillie have shown that the administration of a low protein diet usually reduces the non-protein nitrogen in the blood of cases with retention and will frequently keep it down to normal.

Foster recently reported some studies of cases in which the nitrogen balance was influenced favorably by the administration of large quantities of water. These were cases in which the power of the kidney to excrete water was unimpaired. This is in accord with clinical experience. Care must be observed so as not to produce edema.

Finally, the effect of the treatment may be observed by means of repeated tests.

In conclusion, it should be emphasized that functional tests are not a substitute for clinical observations. Nevertheless they are of very great value in the diagnosis, prognosis, and treatment of nephritis and amply justify a more general use.

INDUSTRIAL HERNIA.

SMITH (*California State Journal of Medicine*, September, 1916) thus quotes the working definition of industrial, or traumatic, hernia laid down by the Industrial Accident Commission:

"The rupture must occur at once following an unexpected blow, fall, or strain greater than the individual meets in the regular run of his occupation. The production of the rupture must be accompanied by pain that disables the patient at once and continuously, and makes immediate recourse to the surgeon imperative. The patient must furthermore furnish clear evidence of non-existence of hernia previ-

ous to the alleged accident." This definition has been evolved on the premise that true accidental, or traumatic, hernias are exceedingly rare, and that the alleged accident is usually the occasion and not the cause of the rupture. Therefore insurance carriers have felt that every hernia case is a borderline one, with considerable expense involved in coverage, and a probable responsibility traceable to congenital weakness; therefore they have always insisted on a close correspondence to the above definition to assume the expense of operation and care.

There came to Smith a man suffering from hernia first observed when delivering a three-ton load in 100-pound kegs. This exhibited the customary features of a beginning hernia which was accentuated whilst the patient was attempting to lift part of an 800-pound barrel of white lead, incident to which strain he felt something tear loose in his groin which disabled him for part of that day and completely the next. When this patient entered the employ of the firm he had no hernia. An operation was performed showing a sac about 4 inches long with a wide base free from adhesions, but not very thick. There were also evidences of traumatism of the muscle fibers at the borders of the internal ring. Two days after operation the officials of the State Fund wrote that they had decided against this being a true traumatic hernia, and requested that operations in the future be delayed until authorized by the Medical Department. Smith submitted a report to the State Fund with his bill for \$76.50, including his assistant's fee of \$10 and the anesthetic bill of \$5. The bill was regarded by the attorney for the Commission as excessive. The adjuster also reported that this was not an accidental hernia, and the doctor was requested to look to the patient for his remuneration. Ultimately the bill was paid. Smith reports this case because the conclusions to be drawn from it are of interest to the whole medical profession.

First, it demonstrates again the absolute impartiality of the Commission, and that the State Fund takes its chances in every

decision along with every private company. Second, the case shows the need, as an economic business principle, of complete physical examination of every man covered by the liability act, to discover existing pathology and congenital weakness, and then to adequately guard against disability in each case found to be abnormal.

ROENTGENOGRAPHY IN THE LOCALIZATION OF BRAIN TUMOR.

HEUER and DANDY (*Bulletin of the Johns Hopkins Hospital*, November, 1916) summarize the clinical study of this subject as follows: With the exception of the comparatively few which show definite tumor shadows, roentgenograms of the head are merely an aid, though an important aid, in the diagnosis of brain tumor.

Uncalcified tumors do not cast shadows in the roentgenogram, unless tumor tissue has invaded the accessory sinuses. A possible exception may be hypophyseal lesions which are viewed against the dark temporal fossa.

Calcified or bony tumors cast shadows which are readily recognized. In the authors' experience such shadows occur in 6 per cent of patients with brain tumor. Judging from the literature, however, their experience has been fortunate.

The signs in the skull of increased intracranial tension—i.e., enlargement of the skull, separation of the cranial sutures, general convolutional atrophy, and destruction of the sella turcica, have considerable value in the differentiation between cerebral and subtentorial lesions; for they indicate an internal hydrocephalus which occurs only rarely in cerebral tumors, but is the usual accompaniment of posterior fossa tumors. It is of importance to remember that destruction of the sella turcica may be a general pressure phenomenon, especially in the differential diagnosis between suprasellar and cerebellar tumor in blind patients.

The local changes in the skull due to brain tumor are of greatest value in the diagnosis of hypophyseal or suprasellar lesions. The combination of characteristic

eye changes and local sellar destruction or enlargement makes the diagnosis the most certain, perhaps, of all intracranial conditions.

Local hypertrophy of the skull over cerebral tumors is of definite diagnostic value and has occurred in 4 per cent of patients. Local atrophy of the skull over tumors is of equal diagnostic importance, but has occurred in only 2 per cent of the patients. Local unilateral vascular changes also have definite diagnostic significance, and have occurred in 4 per cent of the patients. Local convolutional atrophy is of importance in the focal diagnosis of tumor only when demonstrably unilateral; this is rare. Local enlargement of the internal auditory meatus has thus far had very little diagnostic value.

The usual position and characteristic appearance of shadows due to the calcification of structures normally present in the intracranial chamber should be remembered.

In about 45 per cent of the patients in this series roentgenography has been of real diagnostic value.

POST-MORTEM CÆSARIAN SECTION.

HARRAR (*Edinburgh Medical Journal*, October, 1916) quotes an interesting article with conclusions as follows:

It is quite obvious that the death of a pregnant patient undelivered places her medical attendant in a delicate position, and this may easily become one of acute embarrassment if her relatives refuse permission for the section, which may be the only means of delivering the child within the six or seven minutes which is all the time that can be safely allowed to elapse after the maternal decease, if the infant is to have a fair chance of recovery. On the one side he may be faced with a peremptory refusal of permission, and on the other side he is responsible for the life of the unborn child; further, he has no time for consultation and argument. The situation is certain to be a delicate one, but apparently he not only may, but he ought to, extract the child on his own and, it may be, on his sole responsi-

bility, and, so far as statistics can give a guide, he ought to employ the Cæsarian section as the method of extraction. A further difficulty is that the death is usually sudden and may be also quite unexpected, and an added responsibility is now to be discovered in the possibility of an action for culpable negligence if surgical measures to deliver the child are not taken. Certainly no practitioner of medicine can afford to leave his conduct in such circumstances to be settled by resolutions formed for the first time in the presence of the emergency. If it were possible, the doctor's difficulties are added to when he is dealing with not a dead but a moribund pregnant woman.

AN INQUIRY INTO THE NATURAL HISTORY OF SEPTIC WOUNDS.

KENNETH GOADBY (quoted in the *Medical Record*, Nov. 4, 1916) presents a second section of this report which was prepared for the Medical Research Committee. In the first section, published in the *Lancet* of July 15, sinus formation and the bacteria present in sinuses and sequestra were considered. This section of the report deals more particularly with vaccine therapy. The incidence of organisms found in the examination of 200 cases of septic wounds, according to the day of examination after wounding, is presented and detailed data with reference to the vaccine treatment given. Out of the total of 200 cases, the malignant edema group of organisms was found in 38 per cent; the *B. refringens* in 75 per cent; *B. hibler* closely follows malignant edema; *B. proteus* and *B. coli* occur in 47 per cent and 40 per cent respectively; streptococci in 81 per cent; and staphylococci in 86 per cent. Or it might be stated that anaerobic bacteria were present in some 50 per cent of badly wounded cases and about 20 per cent of simple flesh wounds, but the incidence of aerobic bacteria is more common, being met with in about the same relative proportion in all the wounds examined. These wounds were examined at least two days after the injury. The investigation warrants the conclusion

that anaerobic bacteria present in a large proportion of the wounds owe their infectivity to the association with aerobic species, and that among these species the proteus and coli groups and streptococci, some of the latter being facultative anaerobic, are to be regarded as largely concerned in the development of acute septic processes within and around the wounds.

Two series of cases were treated, one with vaccine and one without, the treatment being exactly parallel in other respects. The comparison of these series was based on the determination of the duration of the febrile period as determined by temperature charts and by the period during which the patient remained in the hospital. Examining the two series critically, the evidence is overwhelming that the protection afforded by the vaccines was responsible for the absence of secondary hemorrhage in the vaccine cases. No vaccine case developed acute gas gangrene, although the bacterial flora and the physical condition of the wounds were certainly highly potential. There is a difference of ten days in the duration of the fever in favor of the vaccine cases, and a difference of 27 days in the hospital. As a result of this investigation the author recommends the following routine treatment: Polyvalent vaccines should be prepared from strains of organisms isolated from the infected wounds, consisting of (1) streptococci (aerobic and anaerobic varieties), sensitized with antistreptococcal serum; (2) *B. proteus*; (3) *B. lactis aerogenes*; and (4) *B. coli*. A mixed vaccine of sensitized polyvalent streptococcus 5,000,000 with *B. proteus* 10,000,000 should be given to all septic cases when admitted, pending the bacteriological report. In cases of gas gangrene streptococcal vaccine combined with *B. proteus* and *B. lactis aerogenes* should be used in strengths of 10,000,000 each. The inoculations as indicated by the bacteriological examination should be repeated on the third day, and the dose raised to 10,000,000 streptococci with 20,000,000 of the appropriate bacilli. Meanwhile, autogenous vaccine may, if necessary, be prepared for special cases when desired.

able. The author also discusses plating and wiring in septic fractures, and states that in severely septic wounds it is not invariably followed by the disastrous results sometimes attributed to this method. When plating and wiring are carried out in immunized subjects the results seem highly satisfactory.

SPLENIC ENLARGEMENTS.

DOWLING (*Northwest Medicine*, November, 1916) notes that in a general way the spleen is classified as one of the ductless glands, not related to the ductless glands of epithelial origin and with a known internal secretion, viz., suprarenal, thyroid, and pituitary glands, but rather to those containing lymphoid tissues, as the thymus.

Nor is the difference in genesis and ultimate structure the only difference between spleen and thymus on the one hand, and thyroid, suprarenal, and pituitary on the other. Physiologically, each of the glands of epithelial type furnishes an internal secretion which is necessary to development and to the maintenance of normal life, while no such secretion has been demonstrated for the spleen, nor does its loss through removal for injury or other pathologic conditions destroy life or interfere materially with the vital function. Pathologically the glands of epithelial type are prone to primary morbid conditions and disease, as Graves's disease and myxedema in the thyroid and Addison's disease in the suprarenals, each leading to secondary alterations in other organs and tissues, while primary disease of the spleen and thymus is rare and involvement secondary to disease of other parts, particularly of the blood and hemopoietic organs of the body, is relatively common.

Little understood as the physiology of the spleen still is, it may be stated that the principal function of the organ is that of a great filter, removing solids, disease-producing organisms, and effete red blood cells from the blood to purify it; phagocytosis is also a normal function. The theory that red blood cells are formed in the spleen

has not many supporters, although a small number of lymphocytes is furnished. As to the presence of internal secretion, Pugliese claims that the formation of the bile pigment is decreased 50 per cent in cases which have undergone splenectomy. Stewart admits the possibility of a pro-trypsinogen ferment elaboration, and Starling suggests the control by the spleen of uric acid formation and points to the increased output of uric acid in chronic enlargements of the spleen and in leucocythemia.

Experimental removal of the spleen causes no change in the number of red blood-corpuscles and leucocytes. Compensation takes place only in the lymph glands and is followed late (in the second year) by a marked eosinophilia (Kurloff).

The author reports seven cases of chronic enlargement: The first due to pernicious anemia, resulting fatally. The second classed as splenomegaly, very possibly a chronic streptococcic infection; this patient recovered. Third, an instance of chronic malaria. The fourth, an instance of sarcoma resulting fatally. The fifth due to Banti's disease, weak from youth and bleeding profusely; this patient died. The next one of primary splenic anemia subject to operation, recovering completely. The seventh, splenomedullary leukemia; result not stated.

As regards the diagnosis in cases of chronic splenic enlargement, it may be said that the patient often comes knowing of the lump in his side. Less often is the enlarged spleen discovered during a routine examination. When such an enlargement is found more accurate classification is demanded. Direct diagnosis by means of the blood examination is always possible in splenomedullary leukemia and often in malaria. The others are diagnosed by a process of exclusion, blood examinations giving the bulk of the information. All elements of the blood must be investigated, the red blood cells, the white, and the percentage of hemoglobin. A Wassermann should be done in every case. The presence of parasites in the bowels must be excluded by examination of the feces.

Even when the condition has been classified with some accuracy, our diagnostic opportunities are not exhausted until careful search has been made for foci of chronic infection or slight, long-continued hemorrhage. Very surprisingly good results have followed the removal of chronic areas of infection and the administration of appropriate vaccine treatment.

Although medical treatment can give good results in the specific infections and considerable amelioration of symptoms and prolongation of life in the incurable anemias and leukemia, it is to surgery that we must look for the real cures. Arsenic, iron, glycono-benzin, and the x-ray are quite uniformly aids, but none effects a cure.

Since J. Collins Warren's paper in 1901 the surgery of the spleen has been studied extensively, and there is now a mass of data large enough to enable us to form certain fairly definite conclusions: first, as to the immediate mortality of splenectomy and the conditions influencing; and second, as to the class of cases not likely to be benefited by operation. Among the latter may be included leukemia, atrophic cirrhosis of the liver with secondary splenic enlargement, and amyloid disease.

Warren, quoting from Hagan, gave the general mortality of his collected cases of splenectomy for all causes prior to 1894 as 50 per cent, in 360 cases subsequent to 1894 and before 1901, 38.3 per cent. Eliminating incurable and poorly diagnosed cases, he arrived at a legitimate mortality of 12.2 per cent. Different conditions for which splenectomy was done were followed by death, as follows: Wandering spleen, 7 per cent; malaria, 22.4 per cent; rupture, 41 per cent; sarcoma, 50 per cent; leukemia, nearly 100 per cent. No figures were given for primary splenic anemia.

W. J. Mayo (*Ann. of Surg.*, vol. lxii, No. 2) gives as conditions producing a high mortality "a spleen enlarged and adherent and the patient suffering from a high grade of anemia with myocardial and renal changes, marked by edema of the lower extremities, or suffering from ascites, jaundice, high temperature, etc."

Two points remain to be emphasized: Primary splenic anemia, pseudoleukemia, splenomegalie primitif, and primary splenomegaly are one and the same disease, while Banti's disease is only a later stage of the same affection, presenting in addition hepatic cirrhosis and ascites; and second, each patient with these curable types of splenic anemias passes through a stage during which, if the diagnosis be made, a relatively large proportion can be cured with reasonable safety by the operation of splenectomy. We must recognize that cirrhosis of the liver and cardiac, vascular and renal changes are not improved by the knife.

A NEW REMEDY FOR SYPHILIS: LUARGOL OR "102."

BONARD (*Lancet*, Sept. 23, 1916) describes "102" as more active than any other arsenical compound in trypanosomiasis. The immediate therapeutic effect of luargol is about the same as that obtained from arsenobenzol in doses three times as strong. There is prompt symptomatic cure. The Wassermann becomes negative shortly. Moreover, the drug is a powerful tonic, is extremely stable, keeping in solution without alteration for many hours, nor is the treatment attended by danger in ordinary cases. The injection can be repeated every second or third day.

Luargol is a light-yellow-orange powder insoluble in water. It is soluble in a solution of sodium hydrate, 0.40 cg. of the latter being able to neutralize 1 gm. of luargol. Practically the best way to proceed to get the solution is to dissolve 1 gm. of the powder in 15 Cc. of a 4-per-cent solution of sodium hydrate. The powder dissolves quickly, and a dark-brown, nearly black, thick solution is obtained. The injections can be made by the syringe with concentrated solutions, in the same way as with neosalvarsan by Ravault's method; in this case a one-per-cent solution is prepared by adding distilled water up to 100 Cc., each Cc. containing 0.01 gm. of luargol. If the glass-tubing apparatus is preferred, the

solution must be 1 per 1000, and made by adding normal saline up to 1000 Cc. Each 10 Cc. will contain 0.01 gm. of the drug. In both cases the solution is filtered. This way of proceeding is very convenient for hospitals where a great number of injections are made at the same time. The preparation is supplied in sealed tubes containing 1 gm. for hospital purposes, or in five different strengths—viz., 0.10, 0.15, 0.20, 0.25, 0.30 gm.

In acquired syphilis with primary, secondary, or tertiary symptoms without nervous complications, the following doses should be injected in a normal adult patient: 0.15, 0.20, 0.25, 0.30, 0.30 gm.—*i.e.*, totally 1.50 gm. in six injections repeated every second, third, or fourth day. For a female patient in the same condition the following doses: 0.10, 0.15, 0.20, 0.25, 0.25, 0.25 gm.—*i.e.*, totally 1.20 gm. In cases with nervous or any other complications the treatment should be carried on with quite small doses increased very slowly, if the first dose is well tolerated. The injections are made into the veins exactly in the same manner as is employed with any other drugs. If a concentrated solution is used with the syringe, the injection is to be made very slowly into the vein, especially with doses over 0.15 gm. No food should be taken for four hours previous to the injection. The patient must rest for a few hours afterward. He can have a cup of tea, but no food is to be allowed until four or five hours after the injection, when a light meal may be taken. It is better to make the injection about 5 or 6 P.M., as then the patient can rest until the following morning.

The contraindications for luargol are the same as for other arsenical compounds—*i.e.*, asystole, uremia, and a cachectic state not due to syphilis. In badly compensated heart disease and in syphilitic affections running an acute evolution, such as acute meningitis, nephritis, jaundice, etc., the increasing doses should be very small, 0.006 to 0.003 gm. There are very few absolute contraindications, as luargol is always well tolerated and seems to be harmless in uncomplicated cases.

The therapeutic effects have been more rapid than with salvarsan, neosalvarsan, galyol, novarsenobenzol, or neokharsivan in every case. No serious complications or reactions have been observed. All symptoms of the disease have cleared up rapidly. The injections have been made with concentrated solutions of "102" by means of a 20-Cc. glass syringe. All out-patients have been treated in the consulting-room and have left directly afterward. In some cases they did not even strictly follow the instructions given, but no harm appears to have resulted. In the wards of the Lock Hospital the patients were not kept in bed after being injected. Frequent small doses have proved to be of greater benefit and to give better results than larger doses at longer intervals. Luargol alone has been given in every case and no local treatment made.

Danysz showed that after intravenous injection of a product of the dioxydiaminoarsenobenzol group, symptoms of poisoning of very alarming aspect are sometimes observed: congestion of the face, dyspnea, urticaria, trembling, and contraction or weakness of the limbs, convulsions, headaches, accompanied or not by temperatures of 102°, 104°, and even 105°.

Struck by the resemblance of some of these symptoms to those of nitrite poisoning, M. Milian has given them the name of "nitritoid crises," and it is under this name that these accidents have since been generally described. These troubles always appear during or immediately after the injection, and no apparent symptom enables the practitioner to foresee the possibility of such an accident, generally more alarming than grave, which may arise in the case of individuals of the best constitution having all organs in perfect condition. Again, a nitritoid crisis may be observed in the case of one or two patients out of ten or fifteen who have received injections at the same time of the same product, prepared for all of them and taken from the same vessel; or the crisis may appear in the case of a patient who has already well borne one or several injections, and who may bear very well the subsequent ones.

All monosodic or disodic products of the arsenobenzol group become turbid and yield a precipitate in the presence of chloride of sodium, carbonates, phosphates, sulphates, and chlorides of alkalies and magnesia, and more especially of phosphates. Some of these precipitates may redissolve in the same liquid, others remain insoluble even in an excess of soda. Their formation is prevented or retarded in certain cases in the presence of sugars, and rather accelerated in other cases (for instance, in the presence of glycerophosphate of lime). In general, a trace of these salts (1 or 2 drops of a 1-per-cent solution in 10 Cc.) will suffice to produce an appreciable effect.

If a rabbit is injected with a solution which becomes turbid in the physiological solution of pure sea salt in less than ten minutes, a nitritoid crisis is always produced in the animal, which crisis will be fatal with a dose of 0.20 gm., very grave but not always fatal (dyspnea, diarrhea, convulsive fits) with a dose of 0.05 gm. The last rabbit will, some hours afterward, bear very well, without any crisis, a dose of 0.20 gm. of a solution which does not become turbid, in the presence of NaCl in the proportion of 8:1000, until after five or six hours. On the other hand, this latter solution will, if injected in the same dose, produce a fatal crisis in the case of a rabbit previously injected—one might say “rendered more susceptible”—with a few centigrammes of a phosphate of lime.

Ch. Fleig has found, in the necropsy of rabbits which had died from an acute nitritoid crisis, that precipitates of arsenobenzol were present in the capillaries of the lungs. Danysz has been able to corroborate this fact, so that his experiments enable him to assert with certainty that all the troubles which appear immediately or some hours after the injection are caused by the formation of a precipitate in the circulatory system.

It is scarcely necessary to point out here that the differences in the symptoms observed correspond to the differences in the nature of the precipitate, and that these differences may themselves be determined by

differences in the richness of the blood in certain salts (temporary or constant), in the intestinal mucous membrane, the skin, the kidneys, the brain, or the lungs. In the latter case carbonic acid may play an important part.

The whole of the troubles observed after injections of the products of the arsenobenzol group are also met with in identically the same form in the anaphylactic crisis, and it would be difficult to find a combination of experimental conditions more appropriate than those of the experiments just made with luargol, to prove that in an active or passive anaphylactic crisis it is the precipitate which is the principal agent in the pathological manifestations. In both cases there are the same symptoms, the same causes (formation of precipitates *in vitro* and *in vivo*), the same means of avoiding the crises by anesthetics or vasoconstrictors, as has been demonstrated by M. Roux with regard to anaphylactic and by M. Milian with regard to nitritoid crises.

Thrombosis, phlebitis, and other local affections caused in the injected veins, if not due to faulty technique, may be attributed to excessive alkalization of the solution.

Affections of a general nature—vomiting, diarrhea, shivering fits, headaches, transient rise of temperature—which may appear in a few minutes or some hours after the injection, as well as the nitritoid crises, are caused by the dilatation of vessels and the formation of a precipitate which is temporarily retained in the capillaries.

The rapidity with which these crises appear, and the degree of their gravity, will depend on the dose of the product injected and its degree of concentration. By increasing the dose the volume of the precipitate is increased; by increasing the concentration its formation is accelerated and the volume and density of the granules are augmented. Sufficient alkalization of the products will obviate the appearance of nitritoid crises and other troubles in the case of individuals having blood of a normal average composition. To obviate the troubles caused by soda, the strength of which it is always difficult to maintain at

the same percentage, it would be preferable to use chiefly disodic products prepared beforehand.

Assuming that the alkalization is adequate, the formation of precipitates may be promoted by the presence in the solvents of sea-salt, and especially of phosphates, carbonates, sulphates, and chlorides of earthy alkalies and magnesia.

The formation of precipitates may be retarded, and the gravity of the nitritoid and anaphylactic crises thus diminished, by the following means: (a) By prolonging the duration of the injections and making them in the form of highly diluted solutions; (b) by making the dilution with distilled water or isotonic solutions of sugar, which delay the formation of precipitates in most cases; and (c) by injecting at the same time anesthetics or vasoconstrictors.

The neutral compounds of the products of the arsenobenzol group which may be obtained by combination with methylene or formaldehyde, sulphonylate of sodium, neo or novo arsenobenzols, etc., do not precipitate in the presence of chlorides, sulphates, and carbonates, but will do so in the presence of certain phosphates. These products will therefore not produce rapid crises save under exceptional conditions, but their use gives comparatively more often rise to tardy but graver accidents.

As regards the products of the arsenobenzol group, the formation of a harmless or not very injurious precipitate, which manifests itself by slight troubles in from one to six hours after the injection, is an essential prerequisite of their therapeutic efficacy; time is an important factor in this instance. The sodic products are therefore more active than the neutral (novo) products, and when they are well prepared and injected with the necessary precautions they are less dangerous than the neutral products. In fact, as in order to obtain the same curative effect we are obliged to inject the neutral products in two or three times stronger doses, they will, if retained in the organism through some cause or other and forming precipitates or toxic compounds, cause graver accidents than the sodic products.

It seems that under otherwise equal conditions the compounds which produce the same curative effects in relatively smaller doses will also be less dangerous to the patients.

It is too soon to say that "102" is the best remedy for syphilis, as we do not even know if salvarsan ("606") really cures this disease, though its beneficial results in many cases are undisputed. But luargol is certainly a step forward in the therapy of syphilis, for it has proved its efficacy, since quite small, non-toxic, and generally harmless doses give satisfactory clinical results.

AN IMPROVED SUBSTITUTE FOR IODIZED CATGUT SUTURES.

WATSON (*Surgery, Gynecology and Obstetrics*, November, 1916) has shown in a previous communication that a double salt of iodine possessed marked advantages over iodine for the impregnation of catgut sutures.

Potassium mercuric iodide in water and alcoholic solutions possesses more than ten times the germicidal efficiency of iodine.

Sutures impregnated with this double salt have a tensile strength 6.5 per cent greater than plain sutures, and 16.5 per cent greater than iodized sutures.

Sutures impregnated with the double salt, when sealed in tubes containing a suitable storing medium, show no deterioration when the tubes are subjected to boiling water.

The substitution of potassium mercuric iodide for iodine seemed to constitute such a distinct improvement in the preparation of antiseptic sutures that it was deemed desirable to develop a method for thus impregnating suture materials, and then to subject such products to exhaustive bacteriological tests. The experiments reported were planned to determine the efficacy of the procedure in producing sterile sutures, and the degree of antiseptic or germicidal powers imparted to such sutures by their impregnation with potassium mercuric iodide.

To this end, therefore, raw, dehydrated catgut sutures were treated with an alco-

holic solution of this salt, placed in tubes with various storing fluids, and the tubes sealed. Heat sterilization was omitted in order to make the conditions of the test more exacting. All tests were controlled with samples of plain, chromic, and iodized catgut from several reliable manufacturers.

In conclusion the author states that potassium mercuric iodide is an improvement over iodine for the impregnation of suture materials in so far as their physical properties are concerned.

Sutures impregnated with potassium mercuric iodide possess a decidedly greater inhibiting power on the growth of bacteria than do sutures impregnated in the usual way with iodine.

The inhibiting action of potassium mercuric iodide sutures is a germicidal one.

CELLULOID DRESSING IN THE TREATMENT OF WOUNDS.

DOUGLAS (*Lancet*, Sept. 23, 1916) states that the problem of alleviation of the pain caused by the removal of dressings which have become adherent to the wound is, at present, of more than usual importance owing to the types of wounds from which so many of the soldiers are at present suffering.

The special types referred to are those which either as a result of the primary injury, or of the operative measures necessitated by the onset of gas gangrene, have lost considerable areas of skin. In such cases the dressings are at times so painful as to act very detrimentally on the patients' general condition. Various methods were tried with the view of solving this problem, the principle of all being to place next the wound surface some non-absorbent material which, however, would allow free passage outward of any discharges and inward of any fluid that it was desired should reach the surface of the wound. After the trial of several materials, it was found that there were on the market sheets of perforated celluloid 0.15 millimeters in thickness, the perforations being 1.5 millimeters in diameter, and there being four perforations to each centimeter. This material, which was

rather too stiff to be conveniently applied to the irregular surface of the wound, was found to become perfectly soft and pliable, and at the same time somewhat elastic, after it had been soaked in a 5-per-cent carbolic acid solution for a few hours. The carbolic acid solution having been washed away with sterile salt solution, the softened celluloid can be applied to the wound surface and falls at once into all the irregularities, and any suitable dressing can be applied over it. On redressing the wound it is found: (1) That the celluloid lifts off the surface of the wound without causing any pain; (2) that all the discharges from the wound have passed through the perforations, leaving the surface of the wound quite clean; and (3) that the celluloid has regained its original stiffness, thus making an accurately fitting splint, which tends to keep the wounded tissue in a complete state of rest. After the celluloid has been taken off the wound it is cleaned in tepid water and again softened and sterilized by placing it in the 5-per-cent carbolic acid solution. A convenient plan is to have two pieces of the celluloid for each wound, one of which is applied to the wounded area, the other being kept in a 5-per-cent solution of carbolic acid so as to be ready for use.

This material can be obtained in varying thicknesses, the perforations being of the same size and number, and it has been found that the thicker sheets make an excellent material for the making of splints, especially for those cases for which continuous or intermittent irrigation forms part of the treatment. For this purpose the sheets of perforated celluloid, having been first softened in 5-per-cent carbolic acid solution, are molded to the injured limb. After the celluloid has again hardened it is attached to a metal framework such as may be readily made with the aluminum skeleton splinting supplied in the field, fracture-box.

It was at first thought that the wound granulations would tend to grow through the perforations, but this has occurred only in those cases in which the granulations tended to be edematous, and in these the

celluloid is not required, as ordinary gauze dressings showed no tendency to become adherent to the wound surface.

ANGIONEUROTIC EDEMA AS A CAUSE OF ABDOMINAL PAIN.

DANFORTH (*Interstate Medical Journal*, October, 1916) reports the case of a woman of about forty-five, who had been doing the work of a laundress for some years, but apart from attacks of pain, similar to that which caused her to be sent to him, had been well.

Physical examination showed a fairly well-nourished woman, no tender areas in the abdomen, chest negative, teeth fair, and the throat showed chronically hypertrophied tonsils. There was a relaxed perineum, but the pelvis was normal.

As the history of the pains she had had did not definitely suggest any specific abdominal lesion, and as nothing could be made out upon physical examination, she was sent into the Medical Division of the Evanston Hospital, service of Dr. W. G. Alexander, for observation. Under his supervision she had test meals, barium meals, and fluoroscopic examination of the stomach and intestines, barium enema, examination of the feces, and, in short, all of the usual methods of arriving at a diagnosis. Also at this time a careful and searching history was elicited.

All these procedures were barren of results so far as giving a definite cause for her pain. Nothing could be found either by means of the fluoroscope or in any of the plates which were made which suggested a gall-bladder lesion, ulcer of stomach or duodenum, or appendicitis. Test meals, blood counts, and all other forms of laboratory investigation were equally negative. She had, however, while in the medical ward, three attacks of abdominal pain, the pain being in different parts of the abdomen at each attack, and none of the attacks coinciding with the usual characteristics of any specific abdominal lesion. She also during this time had two attacks of angioneurotic edema, the swelling in each instance being of short duration. On one

occasion the edematous area was upon the back, and on another it was the face which was affected.

The fact that the pains, as described in the history elicited, and as observed in the ward, did not conform to the usual surgical types; as physical examination and laboratory and x-ray investigation were negative; as the woman was of a somewhat neurotic type; as the attacks of pain, though seemingly severe while they lasted, rapidly disappeared, and particularly because of the fact that attacks of angioneurotic edema were observed, a diagnosis was made of visceral crises due to angioneurotic edema, and she was advised not to undergo laparotomy.

Her relaxed perineum, from which she had some real discomfort, was repaired and the infected tonsils removed, since in them lay the only definite and demonstrable focus of infection which could be discovered.

The possibility of this form of lesion should be considered in cases of abdominal pain, and the previous occurrence of localized swelling on the skin should be closely inquired into.

THE LUTIN REACTION OF SYPHILIS.

FLETCHER (*Lancet*, Oct. 21, 1916) concludes a clinical study as follows:

The results of the luetin test in the group of syphilitics examined in the course of this investigation were not so frequently positive as in the cases examined by Noguchi and other observers in America. This divergence of results is probably due to (1) the deterioration from storage of the sample of luetin employed here; and (2) to differences in the methods of treatment in force in the Federated Malay States and the United States respectively.

No positive reactions were obtained in persons free from syphilis; they occurred in syphilitics only. The luetin test is so easily carried out that it would be of the greatest use in general practice if one could always decide, from the result of its application, whether a patient were or were not free from syphilis. Unfortunately this is not the case, for while a positive reaction is

of great significance, a negative result does not exclude syphilis. When performed in conjunction with the Wassermann reaction the luetin test is of great value. In the great majority of instances one or other reaction is positive; but in a given case, even though both reactions be negative, syphilis is not absolutely excluded.

A NEW MECHANICALLY AND SURGICALLY CORRECT METHOD OF BONE GRAFTING.

MAGNUSON (*Surgery, Gynecology and Obstetrics*, November, 1916) notes that it is practically impossible to cut a long slot on one side of the fracture and a short one on the other, moving the long piece of bone down across the fracture, and using the short piece for the purpose of making bone screws as described by Albee, without freeing the muscles from the bone for a considerable distance on each side of the fracture, producing a great deal of hemorrhage both from the muscle and bone, and lengthening the time of operation and shock thereof. This operation can be done very nicely on the tibia, where the bone lies immediately under the skin and where there is no muscle to contend with. Consequently, favorable reports of this sort of graft in the tibia mean comparatively little.

It was to correct the defects mechanically and surgically in the bone-grafting operation that the procedure next to be described was devised. The requirements were: (1) To secure an autogenous graft as small as possible to assure firm retention of the fragments; (2) to eliminate the necessity of traumatizing other fields than that of the fractured bone; (3) to shorten the time of operation; and (4) to place the graft in the bone in such a way that it would prohibit motion in any direction and hold against any pull exerted on it by the muscles attached to the shaft.

This was done by cutting a short graft from the fractured end of the most convenient fragment either proximal or distal. This graft was cut in the shape of an extremely long-sided truncated cone. The end of the graft which formed part of the fractured surface is exactly the width of

the medullary cavity, and the end farthest from the fracture not over an eighth of an inch wider than the medullary cavity, the graft being from one and one-half to two inches long and covered by periosteum. The sides of the graft being cut out with the circular motor-driven saw, the end of the graft is freed with a thin-bladed chisel. The opposite fragment is then angulated slightly out of the wound, and the graft driven in to the end of the medullary cavity to half its length. On account of its wedge shape it fits snugly. The fragment is then brought back into line with its fellow, and the protruding end of the graft is driven down into the slot out of which it came. This being the wider end allows for the thickness of the saw blade on each side, and yet allows the graft to come closely in contact with the walls of the cortex on each side and sink down into the medullary cavity. The result now is that one end of the graft is firmly driven into the end of the medullary cavity of one fragment, the other end being driven into the lower end of the slot out of which it came. There is no way of angulating these fragments except by one end of the graft slipping out of the slot or key-way. This was provided against by drilling through the graft and the opposite cortex, tapping a thread in the bone and putting through an ivory screw which holds the key firmly down in the key-way. The screw is then cut off flush with the graft, leaving nothing protruding beyond the cortex on one side or the graft on the other, and leaving a one-inch trough above the graft to be filled in with new bone.

This operation has been extremely satisfactory in the hands of the author and a few other surgeons who have seen fit to use it. It does away with the necessity of cutting into any other bone to procure the graft and meets all the mechanical requirements of a strong union. There is not as much loosening of the muscles as there would be in a Lane-plate operation, but somewhat more than in the ivory-plate operation. In cases of ununited fracture the bone graft is preferable to any dead bone substance.

The technique described shortens the

time of operation, lessens the shock, and does away with a large amount of the hemorrhage which occurs when the graft is taken from the tibia. Therefore, we believe, it meets all the mechanical and surgical requirements of the internal splint, and that it will be found to be much more satisfactory than the methods heretofore advocated.

TOXI-INFECTION OF THE CENTRAL NERVOUS SYSTEM.

ORR and Rows (*Edinburgh Medical Journal*, August, 1916) note that the intricate anatomy of the nervous system, the complexity of its function, and its comparative inaccessibility to experimental methods have taxed the ingenuity of the investigator and resulted in a general obscurity as to the genesis of almost all its inflammatory lesions.

The authors' investigations were made in part on clinical material, in part on rabbits and dogs. They found that toxic material might reach the cord and brain either through the lymphatics of the sheaths of the nerves or by way of the blood stream. Their researches in the former mode of infection showed that in spinal and cranial nerves there is an ascending lymph-stream to the central nervous system whose main current lies in the spaces of the perineural sheath. Toxins reach the spinal cord and brain by this route; and although they spread to some degree in the lymph spaces of the pia-arachnoid, and so may affect structures at a distance from the point of entrance, they pass for the most part in the main stream along the nerve roots into the substance of the central nervous system. Outside the central axis the nerves are possibly protected by the vital action of their neurilemma sheath; most probably, however, it is the peripheral situation of the lymph current which is the deciding factor.

The lymph system of peripheral nerves is followed by an ascending perineuritis which spreads to the posterior root ganglia and along the spinal roots to the cord. The loose areolar tissue covering the perineurium, the ganglion capsule, and the dura

mater show the greatest degree of inflammation.

In these cases the resultant lesion may be degeneration of the tracts, chiefly ascending, in the neighborhood of nerves through which the toxin came.

On the other hand they found that when the intoxication took place through the blood, as in infections of the mouth, erysipelas of the face, tuberculous abscesses, etc., the lesion produced was a diffuse meningomyelitis of the cerebrospinal axis.

BLOOD TRANSFUSION WITH PARAFFIN-COATED NEEDLES AND TUBES.

VINCENT (*Surgery, Gynecology and Obstetrics*, November, 1916) states that the therapeutic value of the blood is the same whether transferred by the citrate method, with the glass cylinders, the pipet-cannula apparatus, or by the syringe method. Vincent uses a glass tube or flask with a paraffin coating which inhibits the coagulation of blood and allows ample time to transfer it from donor to recipient. He has modified the tube so that it can be used with a needle of special design, which obviates the skin incision on individuals with suitable veins. The tube is a cylinder with a capacity of 300 cubic centimeters, the upper end of which is closed with a rubber cork. About 3 cm. below the cork is a side opening where connection is made with a bulb syringe which is used to express the contents of the tube. The lower end of the cylinder terminates in a glass tip through which the blood enters and leaves the tube. About 2 cm. above the end of the tip is a ground-glass joint by means of which a tight connection can be made with the needle.

The needle is 6 cm. long and consists of a shaft and a socket of about equal length. The socket is made of an unusual depth, so that there is no contact between that portion of the needle and glass tip which projects into the socket below the ground-glass joint. The needle is made in two sizes, No. 14 and No. 16 gauge. The larger size is

usually best. The tubes are cleansed with hot water and wrapped in a towel with the cork and a short piece of rubber tubing and sterilized and dried in the autoclave. The process of coating the tubes with paraffin is then carried out under aseptic conditions. The author has used 54° paraffin and various mixtures of stearin, paraffin and vaselin for coating, but found that a commercial article sold under the name of "parowax" served all practical purposes.

Paraffin which has been melted and sterilized in a metal dish is aspirated into the lower end of the tube, and the outlets are covered with pads of gauze, while the tube is turned to make the wax run over all the inner surface. The excess of paraffin is allowed to run out at the tip, leaving a small amount in the tube to cover the cork when the tube is placed upon end to cool. This forms a disk of wax and makes the tube air-tight. As the tube cools the coating of paraffin appears on the inner surface. One should make sure that this covering is uniform and that the outlets are patent before the tubes are done up in sterile towels and put aside for future use.

The needles are cleansed, dried, and heated until sterile in a dish of melted paraffin. With sterile forceps a needle is then taken from the dish, and the excess of wax is removed by shaking or by blowing air through the needle with a bulb syringe during the process of cooling to prevent the formation of a plug of wax in the lumen. The needles are kept in a sterile box until needed. When the veins of both recipient and donor are small the tube is used without the needle. If the vein is large the needle can be used with both donor and recipient. The average transfusion requires at least 600 Cc. of blood. The needle and tube method without incision applies especially well to the infant with an open anterior fontanelle where the blood is injected into the superior longitudinal sinus. The infant is placed at the end of a table with the head on one side and held firmly in this position by an assistant. The needle is inserted at the posterior angle of the anterior fontanelle exactly in line with the sagittal suture. The sinus is just beneath the skin and dura, and large enough at this point to be located easily even in a new-born infant.

REVIEWS.

A TREATISE ON DISEASES OF THE SKIN. For Advanced Students and Practitioners. By Henry W. Stelwagon, M.D., Ph.D. Eighth Edition, Revised. Copiously Illustrated in Black and Colors. W. B. Saunders Company, Philadelphia, 1916. Price \$6.50.

The first edition of Dr. Stelwagon's standard book on dermatology appeared nearly fifteen years ago, and the appearance of the eighth edition at this time is a wonderful tribute to the quality of his text, the more so as the book covers more than thirteen hundred pages and is not one which would be purchased by the general practitioner unless its practical and scientific qualities strongly appealed to him. The eighth edition has more changes in it than those which were made in early editions over their predecessors. A considerable number of the more rare cutaneous lesions are described for the first time. The

chapter upon Pellagra has been carefully gone over and improved. Thirty-five new cuts have been added, and much information in regard to current and past literature is provided by copious foot-notes. The colored illustrations, which so often are imperfect, are excellent. The book is a model of what such books should be in every respect, and is a monument which marks the progress of dermatology, not only in this country but abroad.

All too frequently the medical author who produces a contribution to the literature of his profession, which is of the first rank, finds that he has gone above the heads of the rank and file, but Dr. Stelwagon has been clever enough in compiling this exhaustive treatise to meet the needs of skilful dermatologists and general practitioners.

A MANUAL OF NERVOUS DISEASES. By Irving J. Spear, M.D. Freely Illustrated. W. B. Saunders Company, Philadelphia, 1916. Price \$2.75.

This is a small book designed to present in concise form modern neurologic opinion. The author is Professor of Neurology in the University of Maryland, and has prepared his text in order to be of assistance to the general practitioner, rather than to the advanced neurologist. He well points out that many of the difficulties experienced by students and general practitioners when studying nervous diseases are due to a lack of proper understanding of the anatomy and physiology of the nervous system, and of correct methods of examining nervous patients. He has, therefore, paid especial attention to those methods of examination which can be readily resorted to by general practitioners, and, without any attempt to produce an exhaustive treatise, has endeavored to provide us with a competent summary of the subject as he believes it to exist to-day. In this endeavor we believe he has been entirely successful.

THE CARE OF PATIENTS UNDERGOING GYNECOLOGIC AND ABDOMINAL PROCEDURES BEFORE, DURING, AND AFTER OPERATION. By E. E. Montgomery, M.D., LL.D. Illustrated. W. B. Saunders Company, Philadelphia, 1916. Price \$1.25.

Many surgeons and many more general practitioners have wished that some competent authority would provide them with the information which this little book of less than one hundred and fifty pages contains. Its object is well described in its title. The author's object in putting together the text has been to lessen the anxiety of the surgeon, promote better work amongst surgeons and nurses, and to instruct interns what they can do for the comfort and relief of patients turned over to them by the operating surgeon. A large number of valuable practical hints will be found throughout its pages, such as the use of an ounce of alum dissolved in one quart of water slowly injected with a gravity syringe to stimulate peristalsis, or as to when the stomach should be washed out to relieve nausea, and the different forms of drainage which give best results in various abdominal operations. We think the book goes a little

too far in printing illustrations of major abdominal operations, since these are scarcely included in its title. Every resident physician who wants to be efficient will do well to become possessed of this little manual, from which, as we have already pointed out, he will be able to gather many important and interesting hints.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume IV, Gynecology. Edited by Emilius C. Dudley, A.M., M.D., and Herbert M. Stowe, M.D. Series 1916. The Year Book Publishers, Chicago, 1916. Price \$1.35.

These books, of particular interest to the practitioner who either from environment or disinclination fails to keep in touch with the progress of the times, are of distinct value even to those who do keep in touch, as representing in the main the most valuable contributions of the current year. Though each specialist would naturally criticize the wisdom of choice upon the part of a colleague, it must be conceded that the articles from which the abstracts are made in this present volume have been selected with discriminating judgment.

THE BIOLOGY OF TUMOURS. By C. Mansell Moullin, M.A., M.D. Oxon., F.R.C.S. H. K. Lewis & Co., Ltd., London, 1916.

Mansell Moullin under this interesting title contributes a brochure of some fifty-four pages in which he eloquently pleads the cause of spontaneous mitosis as the basis for tumor formation. This is a theory which has never appealed to surgeons, most of whom, based on their clinical experience, have a fixed and settled belief in the parasitic origin of many, if not all, of these growths.

A MANUAL OF OPERATIVE SURGERY. By John F. Binnie, A.M., C.M. (Aberdeen), F.A.C.S. Seventh Edition, Revised and Enlarged. Illustrated. P. Blakiston's Son & Co., Philadelphia, 1916.

Each edition of Binnie's Operative Surgery has grown in size, excellence, and popular favor. His effort has been to aid the surgeon when in trouble, and hence he has devoted greater space to some rare operations than to many of every-day importance

which should be familiar to each individual. Thus he has contributed a chapter upon Cardiac Surgery and has added a chapter upon Retro-Peritoneal Neoplasms. He has appended a short chapter upon War Surgery.

This author has been a very close student of modern technique as evidenced in current literature. He has made a wise choice of helpful illustrations, has a happy faculty of clear description, and has contributed a book which is essentially satisfactory.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

This month has been very unpleasant, in that we have had nearly every day fogs of greater or less density, and, as I described before, these fogs naturally increase the traveling difficulties of the inhabitants of London and other cities where drastic light regulations are in force. The inconvenience has been especially felt owing to the time of the year and the early onset of darkness. Electric flash torches are now to be met with in increasing numbers. So long as these are used to illuminate the ground, there is nothing to complain of. Complaints have, however, been raised recently owing to the fact that the flash lamps are turned on to buses in order to read the destination boards, which are fixed at the top of the bus at the front and back. With the present lack of illumination it is impossible to read these boards, and unless one happens to know the destination of the bus by its number, there is no opportunity of hailing the vehicle and boarding it. Those who possess electric torches have got into the habit of turning the light on to the bus as it approaches, in order to read the board in front, the effect of this being to shine the light into the driver's eyes and to temporarily blind him. This has already led to accidents and has been strongly condemned by the coroners' juries who have had to investigate the cause of death in these cases. There is something to be said from the passenger's point of view. It is undesirable to

stop the bus to inquire where it is going, as it is apt to lead to recriminations. On the other hand the buses have so often been stopped on this account that they have got into the habit of neglecting the signals of the people waiting on the pavements, thus causing considerable annoyance to prospective passengers. As each bus carries an illuminated number, the remedy seems to lie with the passengers, who should learn the number of the bus which will carry them whither they wish to go. This might be assisted by the issue of more handbills giving the numbers of buses and their destinations.

The latest restrictions imposed by the government are those which deal with unnecessary railway traveling. The public have been appealed to on general grounds not to travel unnecessarily, but there has been no statement as to the meaning of what is necessary and what is unnecessary, the matter being left to the conscience of each person. But as conscience tends to forget, further pressure has been brought to bear by intimating that the conditions of travel will be fairly uncomfortable. Precedence in third-class carriages will quite rightly be given to the soldiers, especially N. C. O.'s and privates, which I think seems to mean that the general public will have to travel first-class, thus implying a double rate of fare. There is another regulation which will tend to diminish the number of those traveling for pleasure, viz., fares are to be increased 50 per cent on a journey greater than 40 miles. A semiofficial statement appeared in one of the papers stating that the

regulations are not meant to stop people going down to their relations to spend Christmas, but to prevent those who usually go away at this time to some seaside resort for Christmas festivities. During the week before Christmas a large number of young people have to travel home from school, but most of the schools will have broken up before the 22d of December, and the scholars will, therefore, escape the rush. With so many of their men folk away, it is unlikely that many people will travel unnecessarily this year. With the new year, however, traveling will be compulsorily diminished. The railway companies are going through their time-tables, making drastic reductions in the trains. An endeavor will be made to eliminate trains on the different systems which are largely run in competition, and it is anticipated that there will be very little real hardship arising from this curtailment, at all events to the main centers. No doubt the express trains will stop more frequently, and therefore traveling will take a little longer, but with this exception there will apparently be very little real curtailment. That is how the restrictions present themselves under the present imperfect announcements. These restrictions are unlikely to affect the medical profession to any great extent.

There seems to be nothing particular to state about the sick and wounded who are now being returned to England. There does not appear to be as much frost-bite as formerly in spite of the inclement weather. Malaria is evidently epidemic in Salonika, but with the cold weather the new cases should diminish.

It will be remembered that the scheme for national health insurance included the organization of a branch to deal with research work. About three years ago a Medical Research Committee was appointed for this purpose by the government. The committee consisted of a number of scientific and professional men under the chairmanship of the Honorable Waldorf Astor. Prior to the summer of 1914 the committee organized researches in connection with tuberculosis, rickets, and the question of a hygi-

enic milk supply, as well as instituting a large investigation into the problem of industrial disease. With the outbreak of the war, many of these problems had to be set aside, and investigations were directed toward those conditions which interfere with military efficiency or prevent the speedy recovery of the sick. A large amount of pathological work is carried out at the military hospitals, both at home and near the front, and such diseases as trench fever, gas poisoning, disorders of the soldier's heart, and many of the smaller epidemics are investigated under the auspices of this committee. A second branch of the research committee is concerned with army medical statistics, indexes the casualties, and provides reliable data on which pension claims may be founded. The health of the munition worker is also a subject of interest to some of the workers under this committee, and a valuable research on the fatigue of the munition worker has been published, and some of the recommendations are being acted upon. This does not complete all the functions of the Medical Research Committee. Although it possesses its own central institute and departments for research in bacteriology, statistics, biochemistry, and applied physiology, the committee stretches out its arm and lends assistance to research work, which is being undertaken by competent workers in suitable laboratories, medical schools, colleges, and schools all over the country. It has thus become a big coördinating center for the advancement of medical knowledge, and is probably the most successful branch arising from the National Health Insurance Act. Some of the results of the investigations are widely published. Occasionally the knowledge so disseminated is applied in a manner different from that which was anticipated, or was intended. The fact of disseminating knowledge about milk has been that a number of those who formerly took milk as an every-day beverage have now decided to give it up because they have learned that each cubic centimeter of milk contains a very large number of organisms. No doubt this is a passing phase.

THE TREATMENT OF THE MORPHINE HABIT.

To the Editors of the THERAPEUTIC GAZETTE.

SIRS: I read in the *Journal of the A. M. A.* an account of the discussion of morphinism in the Philadelphia County Medical Association.

It strikes me the pathology of this disease is not well understood, in fact many physicians refer to the disease as the "dope" habit. There is no use trying to get results in five days, or five weeks. Every one of these people is a neurotic, neurasthenic, moral degenerate, or something of that class. Can a neurasthenic be cured of his neurasthenia or a moral degenerate be brought to the surface in five days or five weeks?

The indications in these cases are clear enough to any one who takes the trouble to study them properly. It is part habit and part disease, and one should begin treating the disease at the same time one does the habit. In other words, until one gets the disease under control the habit tends to recur. In handling these cases the physician must be a humanitarian and therapist at the same time. The object of the preliminary period of gradual reduction is twofold: First, to improve the patient's physical condition before complete withdrawal; secondly, to improve the patient's mental poise before complete withdrawal. In the old days these people used from 90 to 250 grains of morphine a week. In nearly every case my method has been to cut down to a certain amount, say a drachm of morphine the first week. My only medication at first is one or two aloes and myrrh tablets before meals, and 5 minims of tincture of digitalis and 10 grains of sodium bromide taken in water after meals. I never use cathartics—*i.e.*, compound cathartic pills—as I believe the slow hammering method the better; hence the aloes and myrrh tablet. The digitalis and bromide combination is an excellent one in all cases. Morphine is a heart stimulant, cerebral sedative, and spinal excitant. The digitalis takes the place of the morphine as a heart

stimulant, and the bromide quiets the spinal excitation—a very important point—and thus aids in relieving the neurasthenia. Strychnine should never be used at any stage in the treatment of chronic morphinism.

During the preliminary gradual reduction period I see the patient once a week on a certain day, not any sooner. The medicines I provide myself and the morphine I write a prescription for, plainly stating to be used for disease. The final reduction being so large I sometimes wait two weeks before reducing any more, as I find it takes two or three weeks for the patient to steady himself after the initial reduction.

I then reduce about 2 or 3 grains a week till I reach anywhere from 12 to 18 grains a week (all during this period the patient is working as usual). I then keep the patient at home for about four weeks, during which time the morphine is completely withdrawn at the rate of $\frac{1}{4}$ grain a day, taking from eight to ten days.

The rest of the time is used to recuperate and begins the stage of convalescence. During the last stage the patient should be seen regularly for a year or more.

Morphine causes inactivity of the liver, and of the peptic glands of the stomach. As the morphine is gradually withdrawn, the functional activity of the liver and stomach gradually improves. The diet should be largely of milk and cereals with a minimum of salt. As the morphine is reduced the need of laxatives is lessened. After complete withdrawal, small doses of Epsom salt act the best on account of the excessive amount of hydrochloric acid then present. Under this sensible therapeutic treatment practically every case of morphinism can be cured, and that I believe is saying a good deal. What we are looking for in these cases is rehabilitation physically, mentally, and morally. I have written at length to you because I have studied your Therapeutics for over twenty years, and because I believe you are in a position to disseminate this knowledge far better than myself.

Yours very truly,

ROCHESTER, N. Y.

W. B. REED.

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ORIGINAL COMMUNICATIONS.

SOME PAINFUL CONDITIONS DUE TO COLD: NEW MODES OF RELIEF.¹

BY A. B. HIRSH, M.D., PHILADELPHIA.

Such indifferent results usually follow the accepted treatment of certain results of exposure to extreme cold that any recognized method offering improvement should be welcomed. These accidents, even if classed among the less serious afflictions, may so interfere with daily duties as to call for the best efforts of the practitioner. Pain in either extremity may be continuous from this cause in frigid weather; if less obvious to the phlegmatic patient it none the less is often accentuated to the point of physical torment for the individual of nervous type. It may otherwise vary in degree, dependent upon the severity of the original or subsequent exposures. Extreme cases mainly are those that call for relief by the physician, milder attacks being as a rule borne in silence, untreated.

PAIN IN THE LIMBS.

First may be considered an instance of cold extremities, functional, in one of sedentary habit: An otherwise healthy matron of thirty-nine years had nursed her husband through a protracted acute illness, and then, to meet the financial strain, spent a trying winter season behind the counter in a department store. Neurasthenia, now of four years' standing, resulted, the chief trouble in winter-time (due largely to insufficient exercise) being marked aching sensations in all extremities. There could be no question as to her suffering so far

as objective evidence existed of cold arms and legs; these were almost icy cold at times, even though heavy woollens were worn. Blood-pressure, either arm, sitting, was 155 mm., systolic; 100 mm., diastolic; pulse-rate, 72. The blood-pressure and pulse-rate, lying, were equal but lower on either arm; therefore, physical exploration showing all organs to be in normal position, the more especially "splanchnic" variety of neurasthenia could be excluded. It was evident that the slight hypertension present, possibly also the actual continuation of the neurotic state, depended on long-time marked pyorrhea alveolaris and infected tonsils. Urinalysis proved negative.

It is unnecessary here to go into the great variety of remedies, medicinal and mechanical, massage, and the older kinds of electricity among them, that had been fruitlessly employed; that is the familiar tale with most cases of neurasthenia. Indications called, of course, for removal of the pyorrhea and tonsillar disease, but, aside from this detail, treatment was directed to such systematized passive muscular exercise as would make up for the patient's own psychic inability to bring about normal tissue change. Autocondensation was first given from the coil transformer, the patient lying on a three-inch-thick cushion that rested on a five-foot-long metal electrode, the hands placed on a brass bar that formed the other electrode. This aimed at (1) lowering of the hypertension to remove

¹Read before the Philadelphia Clinical Association, December 18, 1916.

nervous irritation from that source, and (2) thorough heating of the extremities by passage through them and the trunk of a small quantity of alternating current (half an ampere) at a pressure of 10,000 volts and an oscillatory rate of one to two millions per second. There then followed an application of the so-called "wave" current from the static machine for improved general nutrition through vigorous action on the upper intra-abdominal organs, these lying beneath the active electrode, and for coincident uniform passive muscle fiber contractions over the entire body.

Quite naturally, her delay in repair of the gums, teeth, and tonsils, with reinfection from these foci, means an occasional return of her attacks, but relief of the cold limbs and sharp pains is assured. She comes for a few days' treatment at infrequent intervals and seems to be fully satisfied with the comfort thus obtained.

Sure removal of severe aches in the limbs, hands, and feet, due to simply sedentary living, when exposed to inclement weather, as a rule can be promised these sufferers, and not a few confrères are among those so treated.

Cold Extremities from Arteriosclerosis.—Quite another picture is seen when the agonizing pain of such cold limbs depends on markedly sclerosed arteries, and our best efforts can but slightly influence the thickening in the walls of vessels whose lumen is correspondingly narrowed. Even here, though, having in mind the studies of MacCadrack,¹ benefit has followed long courses of autocondensation in some advanced cases. One of these patients, in particular, an old soldier of seventy-three years, unable any longer to walk from this cause, had to be brought to the office in a roller chair for his first visits. Vascular sclerosis was marked, causing abdominal crises, irregular head pains with vertigo, and, at times, mental depression. The blood-pressure, either side, sitting, was 220 mm. systolic, and 140 mm. diastolic; under treatment the ultimate lowest points reached

were 180 mm. systolic, and 120 mm. diastolic. What caused him greatest distress, though, was the aching in his lower limbs usually present in the winter season, pains so aggravated that neither warm clothing nor artificial heat afforded any benefit; indeed, friction in any form only increased his suffering. Here, aside from advising a more concentrated diet, lessening his excessive use of tobacco, and ordering an occasional mild laxative, the main dependence was placed upon (1) daily séance of radiant light and heat by a 500-candlepower hooded incandescent lamp for its improved arterial blood supply; and (2) on autocondensation, repeated on alternate days for months, for the hypertension and to possibly remove some of the more soluble deposit in the vessel walls. The man was able to dispense with the roller chair after the first week, and finally there was relative improvement in all symptoms. What was most gratifying was the practical vanishing of his severe leg and foot pains so that so far in the present season he has not found it necessary to resume the visits to the office.

CHILBLAIN.

Pernio or frost-bite is one of the minor painful results of exposure to low temperature in winter-time, although instances of this accident are not unknown among workers in refrigerating plants at any season of the year. The medical practitioner, though, is only too infrequently consulted for relief of the ache, burning, and itching from this cause, the laity assuming that treatment is of but little or no avail, older treatment methods not preventing annual return of these annoying symptoms.

Let us first have an exact knowledge of the origin and course of the condition: The clearest summary of its development and pathology is given by Arthur Whitfield,² who finds it most frequent in those in whom exposure to cold induces arterial spasm in fingers and toes, one or more. The term "dead finger" expresses this thought, although such a degree of localized anemia

¹Rigidity of Calcified Arteries, *British Medical Journal*, October 18, 1913.

²Skin Diseases and Their Treatment, London, Edward Arnold, 1907, pp. 106-7.

need not necessarily be present. Its development may be circumscribed or diffuse. If circumscribed a deep nodule forms quickly in the corium, causing an edematous patch as large as a split pea, of pale pink color, and with a stretched and shiny condition of the epidermis over it. This nodule gives rise to extreme itching, burning, or tenderness. In most cases the nodule subsides, but one or two further developments may occur. First, the epidermis may be raised as a whole in a thick-walled vesicle which ruptures, leaving a small indolent ulcer, and this may either become infected and spread or may slowly heal with or without the production of a visible scar. Secondly, while not producing so severe a disturbance of the epidermis as to raise it off the papillary body, there may occur a hypertrophy with abnormal formation of the horny layer, resulting in a fissure with thickened edges. The diffuse form is perhaps not properly to be called chilblain, but it is so common an accompaniment of marked chilblain that I class it with these lesions. It occurs as a diffuse edema of part or the whole of a digit, either finger or toe. Vesical formation does not occur, but improper and horny development is the rule, producing roughness, scaling, and fissuring, and lasting long after the cessation of the cold weather, in some cases even producing permanent deformity of the part.

Pathology.—The processes at work . . . there is evidence of (1) an irritability of the nervous system; (2) a special vulnerability of the vessel wall; and (3) in most, if not in all cases, a retardation of the coagulability of the blood . . . hyaline thrombosis has been described as a characteristic feature.

Oliver S. Ormsby³ states that chilblains may be the start of various other lesions or affections, due to lowered vitality from vascular defects. He adds by way of diagnosis that redness vanishes under pressure. While feeling more or less warm, the part is actually cool or cold to the touch; it may even be moist with sweat.

Whitfield (*loc. cit.*, p. 108) correctly advises basing treatment on these pathologic factors, but his remedies are typical of older ideas that must give place to more effective physical means. He would first reduce the tendency to arterial spasm by minute doses of opiates or by such vasodilators as glonoin, grain 1/200, *ter in die*, or erythrol tetranitrate, 1/50 grain, thrice daily. Instead of these he may apply the continuous current, five milliamperes for ten minutes daily for a short or long period, the negative pole on the nape of the neck and the positive in a wash-bowl of warm water for the hand, or a foot-bath of the same for the foot. He condemns woolen gloves, substituting fur or wool-lined leather ones.

Under the newer methods, when a patient is seen during the stage of acute pain, just after receipt of injury, the tissues are usually so exquisitely sensitive that our efforts for relief are limited to (1) radiant light and heat from a 100-candlepower incandescent hooded lamp, swung for about half an hour over the affected area; this to be followed, if the pain abates but little, by (2) the hooded cobalt blue incandescent bulb; finally, by the brush discharge (*effleuve*) from the static machine. When not seen, though, until the subacute or chronic stage is reached, then resort may be had at once to the latter modality, a twenty-minute séance of the brush discharge sufficing (perhaps with some daily repetitions) to contract the relaxed vessels underlying the symptoms complained of. This plan will as a rule succeed, although small resisting areas may need the mild wave current or even fine indirect sparks from the static machine. Because of the thin layer of soft structures between skin and bone, the static brush discharge is always the modality of choice when the ears, scalp, or forehead have been thus frost-bitten. Just the opposite holds true when the face below the eyes has been so badly chilled as to require attention, whether the trigeminus or the facial nerve distribution be the seat of severe pain or of muscle

³Diseases of the Skin, Philadelphia, Lea & Febiger, 1915.

paresis. Here we deal with an actual neuritis, with a congestion, effusion, or exudate about the particular nerve involved, and then the static wave current, by squeezing out this abnormal deposit, proves itself a practical specific. Radiant light and heat, ionization with a one-per-cent sodium salicylate solution, either or both, help to remove the pain factor in certain cases.

Fissured lip, finger, or toe (rhagades) calls for the static effluve, the thickened horny margins melting down and the tender exposed corium firmly cicatrizing. No sequel is more satisfactorily treated.

PAIN FROM NASAL SINUS OBSTRUCTION.

Blocking of the intranasal orifice of one or more of the nasal accessory sinuses, oftenest due to acute coryza (more frequent during wintry weather), may cause more or less marked pain, either from the vacuum created by congestion in the sinus or from actual suppuration or both. Incidentally two cases of extension of the acute condition with fatal meningitis, occurring within the past few months, are known to the writer, suggesting that prompt removal of the mucous congestion calls for better methods than have hitherto been in vogue. The profession, for instance, now realizes that intranasal deformity, as a cause of local congestion, must first be corrected as a means of prevention. When consulted for acute sinus pain, dependent upon other causes, five new measures are now at command of the practitioner: (1) It is usually possible to lessen the acute mucous membrane swelling by acting on the nasal vasomotor nerves through a five-minute manipulation of the intervertebral space below the seventh cervical vertebra. This simple maneuver, first advocated by Abrams of Stanford University,⁴ may be digital or carried out by a plexor and pleximeter, the vibrator, the concussor, or the rapid sinusoidal galvanic current. (2) At times directing the rays of the cobalt blue hooded

incandescent bulb into the nasal cavities will ease both congestion and accompanying pain.⁵ (3) For *frontal* sinus involvement the patient lies face upward, and eyes protected by thick pads of moist cotton; the rays of a 500-candlepower hooded carbon filament lamp are directed over the face, and especially the forehead, for fully one hour.⁶ (4) Acute sinus involvement, other than frontal, may be removed by the Oudin or Tesla current, from the coil transformer, applied through the usual glass vacuum nasal electrode. This has at times been alternated with the static wave current through the same electrode, in which case the spark-gap should not exceed half an inch to avoid irritation locally.⁷ (5) In a few cases success in reducing the intranasal congestion has followed resort to the static effluve, directed by the de Kraft "blue pencil" electrode into the obstructed nostril.

Conclusions to be drawn are:

Aching chilled extremities, the cause of actual distress, may be fully relieved by autocondensation followed by the static wave current. Removal of infective foci or other remote factors is essential for permanence of this relief.

Chilblains, according to degree and part of body involved, require (1) radiant light and heat, (2) the cobalt blue hooded bulb, and (3) the static effluve. Where neuritis or muscle spasm coexists the static wave current and static indirect sparks are added.

Sinus pain, from intranasal congestion, usually vanishes after resort to one or more of these modalities: (1) Manipulation of the posterior nerve division below the seventh cervical vertebra; (2) use of the cobalt blue incandescent hooded bulb; (3) radiant light and heat over the frontal area; (4) the Oudin or Tesla current through intranasal glass vacuum electrode; (5) the static effluve by the same electrode.

⁴Report of Committee on Phototherapy, American Electro-Therapeutic Association, 1912.

⁵W. B. Snow, *Journal of Advanced Therapeutics*, Dec., 1914, p. 496.

⁷Frederick Tice, *ibid.*, June, 1913, p. 224.

⁴Albert Abrams, *Spondylotherapy*, fifth edition, San Francisco, Cal., Philopolis Press, 1915.

INCREASING REFRACTION FOLLOWING INCREASED TENSION OF THE GLOBE.¹

BY S. D. RISLEY, M.D.,

Surgeon to the Wills Eye Hospital, Philadelphia.

My early studies on the genesis of the myopic eye suggested the opinion that increased tension of the eyeball consequent upon the congestion of the uveal tract, due to eye-strain in the presence of errors of refraction and abnormalities of binocular balance, was the determining factor in the distention of the globe. At that time a considerable group of cases were published, in each of which the increase of refraction from hypermetropic to myopic through the turnstile of astigmatism had occurred while under observation, and were associated with advancing pathological change in the uveal tract, the observed changes being characteristic of the myopic eye.

I have had the opportunity several times to witness the change from hypermetropic refraction to myopic after recurring attacks of iritis associated with severe involvement of the entire uveal tract. In each case attachments of the iris to the lens capsule had been avoided by treatment, and no permanent impairment of the nutrition of the lens had supervened. These examples are of interest in this study from the fact that they all occurred in adults; in one at approximately fifty years of age—that is to say, at a time of life when the sclera are normally more rigid and unyielding than the relatively tender and yielding sclera of childhood. I now have to report a case of hypermetropic refraction, with high glaucomatous tension, which passed while under treatment into myopia, *pari passu* with complete disappearance of the increased tension and pain.

Miss X., spinster, aged seventy-one, a small, frail woman, came under observation December 2, 1914, with a mild type of arthritis deformans and cardiovascular disease. She had suffered increasing dimness of vision for two years in the right eye, but failure in the left was recent. She was wearing over the right $-2.00 \text{ C} - .50 \text{ cyl. axis } 75^\circ$, $V=6/XX$; for the left $+ .50 \text{ cyl.}$

$\text{ax. } 90^\circ$, $V=6/X$. These glasses had been prescribed two weeks before, but she had worn before receiving them convex glasses:

1891—R. $+ 1. \text{ c. ax. } 90^\circ$ | Add $+ 1.62$ for near,
L. $+ 1. \text{ c. ax. } 90^\circ$

1900—R. $+ 1.75$
L. $+ .75 \text{ C} + 1. \text{ c. ax. } 90^\circ$ | Add $+ 2.50$,

which had been worn for many years for distance with stronger reading glasses.

O. D. The cornea was steamy, anterior chamber shallow, marked ciliary injection, field of vision contracted to nearly the fixation point, pupil dilated medium, $T=50 \text{ mm.}$ The electric ophthalmoscope showed dimly a deep characteristic cupping of the disc. She was using eserine solution of unknown strength, but the pupil did not react to the drug.

O. S. Much the same general conditions were present, but the field was wider and central vision $6/X$ with difficulty and showing tendency to fail. $T=35 \text{ mm.}$, and the pupil reacted to the eserine.

She had arthritis deformans of a somewhat mild type, but suffered frequent painful, acute exacerbations, at which times her eyes were more painful and her vision still further impaired. There was *arcus senilis* in both corneæ. The veins in the fundus were large, dark, and tortuous; no white lines could be made out along the border of the arteries, but there was a general veiling of all details by a general edema of the fundus. The blood-pressure was 180 mm. in systole, diastolic 95 mm. , the pressure showing a tendency to rise while under examination, and the pulse was accelerated.

Dr. David Riesman reported as follows: "Some enlargement of the heart to the left, with decided accentuation of the second aortic sound. Summing up I would say that Miss X. has hypertension, probably dependent upon arteriosclerosis, and associated with mild changes in the kidney of the nature of chronic interstitial nephritis."

Her general regimen was carefully regulated, and she was placed upon alkaline treatment with bichloride of mercury $1/100$

¹Read before Ophthalmic Section, College of Physicians, Philadelphia, Nov. 16, 1916.

gr. and daily doses of magnesium sulphate internally. Locally the eyes were subjected to frequent soaking or laving with an alkaline wash, and frequent, systematic instillations of a weak solution of eserine salicylat.

On December 12 vision had risen with her glasses to 6/XII with the right eye, 6/VII-½ with the left, and on the 17th to 6/IX and 6/VI respectively. Her pain was gone, the corneæ were clear, and the edema of the fundus had disappeared. The general condition had improved, B.P.=160°. The field of vision in the left eye was wider, but had not changed in the right. Pupils had both reacted to the eserine. To palpation the tension of both seemed markedly lower; the tonometer showed approximately 28 mm.

The treatment was continued, and no serious exacerbation occurred until April 9, 1915, when she came with eyes injected, marked photophobia and some pain, with increased impairment of general health. The pupils were contracted to pin-head size, but nevertheless the tension had risen to 47 mm. and 32 mm. respectively. She was evidently on the verge of an acute inflammatory attack. After a morning in the office with repeated alkaline stupes and instillations of eserine the attack subsided. Iridectomy was suggested as a probable necessity, but declined.

The history of the following months is an interesting one, noting several exacerbations and a growing mental despondency, but the central vision was maintained and no notable changes in the fields of vision until August 27, 1915. She then suffered a severe return of redness and pain with reduced vision, which again subsided while in the office under repeated alkaline laving and instillations of eserine. The following day, August 28, she returned with injection and pain gone. V=6/XII O. D., 6/IX O. S., T=O. D. 20 mm., O. S. 30 mm., B. P. 115° in systole. Her physician a few days later reported that Miss X. was very feeble, had many exhausting trials and embarrassments to endure at home. She was then admitted to the Media Hospital for care and treatment. The general condition

again improved, but the central vision steadily failed, and she had difficulty in moving about alone after her discharge from the hospital. Discomfort with the eyes had disappeared, and there were slight variations in the tension but none in the field of vision until May 4, 1916. She was then free from pain and the balls were both soft. T=15 mm. O. D., 20 mm. in O. S., O. D. V = 6/XXV, with -4. V = 6/XV, O. S. -1.50 C - .50 cyl. axis 180°, 6/X.

Since that date, May 4, 1916, there has been no recurrence of increased tension or pain. The anterior ciliary vessels have remained engorged, the anterior chamber of normal depth, and her general health somewhat better. The central vision O. D. -4. D. 6/XV +, O. S. -1.50 C - .50 cyl. axis 180°, 6/X.

With one slight exacerbation early in September, associated with an attack of rheumatism in the shoulder, the eyes have remained fairly comfortable, and on September 22 she received for constant wear O. D. -3.50 C - .50 cyl. axis 90°, V = 6/XV, O. S. -1.75 C - .50 cyl. axis 180°, V = 6/IX + 4. added as bifocal, T = 15 mm. and 20 mm. respectively.

This history awakens inquiry as to its explanation. Was the increasing refraction to be explained by changes in the crystalline lens? This is not a very unusual occurrence, but swelling or sagging back of the lens would not explain the disappearance of the, at times, almost stony-hard eyeball; nor would the swelling and increased opalescence of the lens be compatible with the maintenance of the central acuity of vision or of the fairly normal depth of the anterior chamber. A careful study of the balls revealed an obvious, quite uniform thinning of the sclera in the anterior segment of the ball, and just back of the scleral ring a groove encircling the cornea could be demonstrated, as though drawn inward possibly by a drag inward or backward through shrinking or atrophy of the ciliary body. It is to be presumed, therefore, that an actual increase in the anteroposterior axis of the globe had taken place in response to the prolonged intra-ocular tension.

"THE CURE" AT THE BEDFORD SPRINGS OF PENNSYLVANIA.

BY HENRY B. INGLE, M.D., PHILADELPHIA.

The European war has compelled us to learn to do without many of the things which we had grown to consider essential and to develop our own resources to compensate for them. The many European spas and health resorts so much patronized in the past by Americans are now inaccessible, and for years after the war will be undesirable. What have we in this country to take their places with no detriment to our patients? A detailed report of the mineral springs of this country has been made by the U. S. Department of Agriculture and shows their number to be almost legion, so that an analysis of the entire field is superfluous as well as out of the question in a paper of this length.

My purpose in writing this brief paper is to call the attention of physicians to a spring which loses nothing in chemical and therapeutic value by comparison with the best of European springs, and which may be used to efficiently replace the European spas of which we are deprived.

Gordon's Gazette of the State of Pennsylvania says: "In the year 1804 a mechanic of Bedford, when fishing for trout in a stream near the principal fountain, was attracted by the beauty and singularity of the waters flowing from the bank and drank freely of them. They proved purgative and sudorific. He had suffered many years from rheumatic pains and formidable ulcers of the legs. On the ensuing night he was more free from pain and slept more tranquilly than usual; and this unexpected relief induced him to drink daily of the waters and to bathe his limbs in the fountain. In a few weeks he was entirely cured. The happy effect which they had on this patient led others, laboring under various chronic diseases, to the spring. In the summer of 1805 many valetudinarians came in carriages and encamped in the valley to seek from the munificent hand of nature their lost health."

Dr. Caspar Morris of Philadelphia, in the *Medical Examiner*, wrote of Bedford Springs: "Within a very small area are to

be found one spring of pure slate water, another impregnated with hydro-sulphuric acid, a very copious spring of mountain limestone water, and that which gives special value to the spot, the Mineral Spring."

The first analysis of the Bedford Mineral Springs was made by Dr. Church of Pittsburgh, in 1825, who gave the result to the public through the medium of a communication to the Pittsburgh Medical Society.

The therapeutic use of Bedford Springs is therefore, as judged by our American standards, historic. Indeed, the waters were more appreciated by our forebears than by us, and for a century have been patronized by the most conservative and scientific physicians of the south and east. A perusal of the old registry books reveals names of historic interest. President Buchanan and many of his cabinet and foreign diplomats were taking the "cure" at Bedford Springs when Queen Victoria's greeting was sent over the first Atlantic cable, the message being relayed to him there.

Indeed there is a glamour of the old south that still clings about the older buildings and adds its charms to the many natural and artificial beauties of the Spring. It is a peculiar fact that Bedford is and was more appreciated by Southern people than Northerners, and the effect has been to give an intangible charm to the place which is unique.

The Springs are located in a beautiful valley in the eastern range of the Alleghany mountains—contiguous with the Cumberland valley in the southwestern part of the State. The Lincoln Highway runs through Bedford, thus making an auto trip to the Springs a real pleasure trip. The hotel itself, adjacent to the Springs, is an excellent collection of five buildings of southern colonial architecture, with white-pillared porticos and porches on all floors. It extends parallel to the road in a beautiful grove of old trees with a well-kept lawn.

In back of the hotel is Constitution Hill, with a copious spring of absolutely pure water at its base—the “sweet spring.” In the hotel grounds, but 100 yards distant from the hotel, is the Sulphur Spring, a calcic-sulphated-alkaline-saline spring, very highly mineralized, which gives off hydrogen sulphide gas very freely and is entirely free from organic contamination.

Across the narrow valley and reached by a long colonnade from the hotel is the Mineral Spring, of highly mineralized calcic-sulphated-saline water, containing 2705 mg. per liter of minerals. The principal salts are calcium sulphate, magnesia sulphate, and calcium bicarbonate.

A beautiful nine-hole golf course extends up the valley, and, with tennis courts, horse-back riding, a modern-tiled swimming pool, and beautiful mountain walks, offers varied forms of amusement and exercise to the guests.

Just outside the reservation of Bedford Springs is the town of Bedford, where many smaller hotels and boarding-houses offer lesser accommodations when desired. The season at present is from early June to the middle of September, and the time for the cure is 21 days.

Arriving at the Springs after a short drive from Bedford, we discover that the office force and many of the employees are the same as at the Royal Poinciana at Palm Beach, Fla., in the winter, thus insuring most efficient service. Intimating that it is desired to take the cure one is escorted to the doctor's office, where a full medical record is made, blood-pressure, urine analysis, and blood count taken, and the diet and regimen are advised.

The class of cases for which Bedford Springs are peculiarly effectual are gout, diabetes, liver disease and gall-stones, rheumatism, intestinal toxemias, and obesity; and secondarily, nephritis. The most satisfactory cases are the gouty ones; the effect of the waters is so remarkable in these cases as to be unaccountable by the chemical analysis alone. I have seen cases treated by the best physicians yield in two or three days to the waters alone. In diabetes, diet

and the use of the magnesia springs is the most efficient plan. I consider the action of the water on the liver as one of its principal effects, not only as a laxative but as a real cleanser.

A suitable mineral water just a little hypotonic to the blood is rapidly eliminated, carrying with its excretion the toxins and waste products found in the blood and tissues; and of course the portal circulation first feels this cleansing force. This to my mind answers the argument so often heard that “any water will do as much if taken freely.” Unlike some of the mineral waters now advertised, Bedford water is not taken in large quantities; five or six glasses daily is an average maximum dosage, and larger doses do real harm.

The usual routine, which is varied for different diseases and individual peculiarities, is to give one or two grains of calomel in divided doses the night before beginning the “cure.” The patient is instructed to arise at 7 or 7.30 A.M., at which time a beautiful bugle call is sounded from the portico. The patient, if ambulant, dresses and walks to the mineral spring and drinks slowly one or two glasses of the water, with an interval of fifteen minutes between glasses, exercising the while by walking up the various pretty mountain paths which are recommended so that the gradient suits the individual strength. One-half hour later he returns to his room, bathes, and dresses, or goes directly, if his exercise is less strenuous, to the breakfast table. At this meal no fresh or acid fruits can be taken, but stewed fruits are considered a part of the regular diet. Rest is advised for one-half to one hour after eating, and in the forenoon two to four glasses of water are again taken, with intervals of fifteen to thirty minutes, accompanied by exercise, advised for the individual case. If active exercise is impossible massage and restricted movements are advised, and baths, packs, sprays, etc., used to meet individual requirements.

The reputation of the cure at Bedford has been attained almost solely from the potency of the waters themselves; for the

various hydrotherapeutic adjuncts, mechanical apparatus, electricity, etc., have been but little utilized.

The sulphur spring has been used but little, and only in the past two years has it received any of the attention it merits. It has, however, a well-established reputation among the older habitués of the Spring as a soporific, and I would like to have explained to me why water of its character which gives off freely hydrogen sulphide gas should act as a somnifacient. That it does so I know from varied experience. Whether

it is the cause or the effect of Bedford's more extensive favor in the South, I find that many of the leading physicians of Baltimore refer cases to the Bedford cure, while in Philadelphia it is used by only a few of our best men.

Its location, its undoubted merit, and the unassailable fact that it offers as much medically and socially as any other American or European springs, should make its use by physicians more common, and add a valuable therapeutic weapon to our "Made in America" armament against disease.

A CLINIC AT THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

BY H. A. HARE, M.D.,
Professor of Therapeutics and Diagnosis.

Before showing you the patient which I propose bringing into the amphitheater later in the hour I wish to speak of the case of typhoid fever which I showed you two weeks ago. I refer to the young Italian lad of about nineteen, who at that time, you will remember, had had a number of fairly copious intestinal hemorrhages. These hemorrhages continued. At about 12 o'clock at night a week ago he developed a marked tympanites, seemed to be somewhat restless, but didn't complain of any abdominal pain. There was no fixation of the abdominal muscles, nor was there any leucocytosis, which might, if it had been present, have aided us in determining that there was an intestinal perforation. As he had frequently had tympanites and been restless on previous occasions these symptoms had little or no value, and it was only when, on the next morning, we found a tendency to bulging in the right flank that we decided, without any very excellent grounds for our decision, that the symptoms pointed to perforation and that an operation should be performed. Possibly it was the swelling of the right flank and the increased pulse-rate which led us to this conclusion. Professor Stewart within twelve hours after the symptoms first appeared opened the abdomen and found a *perforation* about 4 inches above the ileocecal valve, which he closed.

The patient stood the operation well, but soon after went into collapse and died within twelve hours. Let me impress upon you the fact that hemorrhage and perforation are responsible for what may be called the "irreducible mortality" of typhoid fever. Whereas thirty years ago the mortality frequently ran as high as 18 or 20 per cent, it is now often not above 7 per cent, and for this 7 per cent hemorrhage or perforation is almost entirely responsible. Until we discover some means by which the suffering from ulceration in the bowel can be modified, it would appear that this irreducible mortality must continue.

The second patient that I wish to speak about is a woman of fifty-six, who began to suffer from fever, nausea, and vomiting the middle of last August. I saw her in consultation the middle of September in Rhode Island, at which time, in the absence of certain examinations of the blood which seemed essential, I found it impossible to reach a diagnostic conclusion. A month ago, still very ill, still febrile, and still vomiting, she was brought to Philadelphia, where, when carefully examined, I found in the right upper quadrant a small area which was distinctly tender on deep pressure. I asked Professor Da Costa to see her with me in consultation, and he advised immediate operation, not being sure whether the

difficulty lay in the gall-bladder, in the pylorus, or in the small bowel. The operation revealed the presence of a single large cholesterin stone in the gall-bladder. This was removed and drainage instituted. The patient did remarkably well for the first ten days, the temperature dropped to normal, and the vomiting ceased. At the end of that time the vomiting returned, the temperature rose at night above 102° , and the condition was considered as alarming. A careful examination of the wound failed to reveal any cause for the fever. Pneumonia at the base of the lung and subphrenic abscess were considered and excluded. There was no leucocytosis. The urine was carefully examined to see if there was any infection of the pelves of the kidneys. Neither microscopic nor cultural methods revealed trouble. Finally, the bile itself was cultured, and a *pure culture of the typhoid bacillus* was obtained. At the end of ten days the temperature became normal, drainage having been made more free by the introduction of a larger tube, and the patient is proceeding in convalescence.

The question arises as to whether the typhoid bacilli in her gall-bladder were due to the fact that she became infected by this disease a short time before she fell ill with her abdominal symptoms so that the period of incubation complicated convalescence, or whether she is a typhoid carrier, having had typhoid bacilli in her biliary passages for many years. The patient denies typhoid fever in her history, but at one time she lived in a part of Pennsylvania where typhoid fever was very prevalent, and where it was also frequently diagnosed as malarial fever. As she had more than one period of severe ill health during her residence in that town, it is quite possible that one of her attacks of so-called malaria was due to typhoid infection.

The most important point for you to remember about this case is that it illustrates what I have so often insisted upon your remembering, namely, that because a patient has one condition that is no reason for ignoring the fact that she may have one or more other conditions. Too frequently

a physician is content, having found one cause for illness, and fails to look for other causes. A man with pneumonia often has nephritis; a man with typhoid fever often has pneumonia. Here was an instance in which our minds being centered upon the surgical operation and the possibility of infection at the site of operation, we, perhaps, did not at first take into consideration every possible, as well as the likely, complications which could be responsible for the post-operative state.

The third case I wish to speak of illustrates the fact that there is a difference between a *surgical recovery* and a *medical recovery*. This woman of forty-eight states that she began to suffer last February with a burning in the stomach associated with acidity. She entered one of the large hospitals and was advised to have her appendix taken out, and also to have her gall-bladder drained. These things were done, and she seemed a little better for a time. Within a month, however, she entered another hospital complaining of pretty much the same symptoms as before; here, again, she was operated upon, the gall-bladder being removed. As you see, she has two large scars, one below the other, in her abdominal wall. She now comes to us presenting all the symptoms of postoperative neurasthenia, a perfect host of aches and pains, burnings, formications, and what a darky would call "general misery," which make her life a burden, and doubtless make her husband's life a burden, and which certainly make my life a burden. She now has in place of her gastric acidity, which I presume was supposed to be gall-bladder trouble, all sorts of aches and pains in her abdomen, and the chances are that there are more organic causes for these aches and pains at present than there were before the operations, since the two openings have probably resulted in the formation of adhesions, and if a third operation is attempted to break up the adhesions, still another set will probably develop. This case, as I have said, represents the difference between a surgical recovery and a medical recovery. The patient has recovered from the effects

of the operation, but she has not recovered her good health, for which she was willing to be subjected to operation. She is far worse than before, and, instead of suffering from functional disorders, is now suffering from organic disorders as well as functional ones. When you get into practice you will frequently meet with cases of so-called operative recovery, which are undeniably such, but which do not bring to the patient the relief sought. One point is that where very definite, distinct, and urgent conditions demand operation it should be unhesitatingly performed, but the other point is that when you recommend that an operation should be done you must bear in mind that it isn't simply a question of recovery from the operation and perfect health, but recovery from the operation with a condition which, frequently, is worse than the first. This should not count when life is in danger, but is a large factor when health is sought.

The next patient is the man suffering a *pernicious anemia* that I showed you about six weeks ago. You will recall that, at that time, I stated that his blood presented every aspect which can be presented by the blood of a patient suffering from this disease, and that repeated examinations absolutely excluded any errors in diagnosis. You will also recall his intense pallor, the fact that he had taken little food and often vomited, and that he was so weak as to be unable to get out of bed. After trying Fowler's solution in ascending doses for a period of two weeks, which is too short a time to give it a fair trial, his condition seemed so desperate that we felt that another plan must be instituted, and we began giving him a grain of cacodylate of sodium every third day by hypodermic injection, with the result, as you see, he has got back what might be called his normal color, is able to walk into the amphitheater without difficulty, and now we have to urge him to remain in the hospital. His red blood cells, which at first numbered only 850,000 per cubic millimeter, now equal 2,160,000. I have never seen such rapid improvement take place in a case of pernicious anemia. It seems too good to be true, and I am in doubt how

much to attribute the improvement to the cacodylate of sodium, and how much we should attribute it to the well-known fact that this disease is characterized very frequently by periods of remission, and even by periods of considerable improvement, but the degree of improvement is rarely, if ever, so marked as it is in this case.

The next patient is a little Italian girl that I showed you a week ago, in whom the diagnosis lay between *typhoid fever* and *miliary tuberculosis*. At that time you will recall that, while undecided, I was in favor of the latter diagnosis, but since then her temperature has become normal, her appetite has improved, her tongue has cleaned off, and she presents the aspect of a patient convalescing from typhoid fever rather than that of a patient progressively ill because of miliary tuberculosis, and this in spite of the fact that she has given us two very markedly positive von Pirquet reactions; the Widal reaction has not been obtained at any time, and her blood cultures are negative. As I have already said to-day in regard to another case, the mere fact that she gives a positive reaction to tuberculin does not prove that the present illness is due to tuberculosis, since she may have healed tuberculous lesions in her body—that is, latent tuberculous processes which have no direct relationship to her present condition. In other words, here is another case illustrative of the fact that because a patient has one disease there is no reason for believing that she has not another. You will recall that the physical signs in her chest, while her fever was present, were rather excessive for the bronchitis of typhoid and much more like those of miliary tuberculosis.

Last of all, I wish to call your attention to several points in connection with this case of *croupous pneumonia*, occurring in a young man of about twenty-three, whose sputum is, as you see, quite typical of that disease. It is not my intention to give a clinic on the whole subject of pneumonia. I only wish to impress upon you these points: First, not to mistake the exaggerated breathing on the normal side for

sounds indicating disease on that side; second, that failure to find the ordinary bronchial breathing or to find the subcrepitant râles does not justify you in excluding pneumonia, for where there is severe consolidation these sounds may not be present. In other words, the absence of normal physical signs may be quite as indicative of disease as the presence of the abnormal ones which you naturally expect substituted for the normal sounds.

As to treatment, let me implore you, before administering any remedies, to exercise the greatest care in determining that the patient really needs medicinal treatment. You are not to treat the pneumonia, you are to treat the patient. You cannot stop the pneumonia or hurry it to its end. Nature helps the patient best in a large number of cases. If the first sound is distant and weak and the pulmonary second sound indicates some engorgement of the right side of the heart, one, two, or three full doses of digitalis will often do great good. If there is evidence of venous turgescence and the patient is full-blooded, plethoric, it may be wise in some cases to resort to bleeding. If pneumonia develops in a patient suffering from chronic interstitial nephritis, whom you know has had, for many months, a very high blood-pressure and a tired heart, it may, in certain instances, be wise to administer not only digitalis, for the purpose of supporting the heart, but moderate and carefully watched doses of the nitrites to lower the pressure slightly, thereby relieving the heart of some of its burden. As, however, a low pressure is usually considered an evil omen, if it develops in the course of pneumonia, care should be taken that great relaxation of the blood-vessels is not induced, and if the pulse speeds instead of being slowed by the digitalis so that it becomes nearly as rapid in number of beats per minute as the systolic pressure is represented in numbers of millimeters of mercury, nitroglycerin or other nitrites should be stopped at once, and, in many instances, it may be wise to use belladonna or atropine to raise the pressure and to establish circulatory equilibrium.

SUBLINGUAL MEDICATION.

In the *Practitioner* for October, 1916, PAULSON says that this method of administering medicine has not received from practitioners the attention it deserves. Since he first devised it, now some thirty years ago, he has used it in his own practice constantly, and invariably with success. Look in the nearest mirror, at the sublingual space. Note the thin membrane, the considerable area, and the large veins, denoting a free flow and return of blood. The space is always smooth, never furred like the tongue, never shielded by mucus, as the stomach always is when in active rebellion, or, maybe, masked by half-digested food.

For the absorption of concentrated remedies (unchanged and uncontaminated) directly into the circulation, he regards the sublingual space as the most reliable surface in the whole body. The only preparation necessary is rinsing with water, if the mouth is dry. A morphia and atropia disc, powdered with the point of a penknife, on paper creased in the center, and dropped just behind the teeth, the tongue being restored to its normal position, will be absorbed in a few seconds. The full effects of the dose may be absolutely depended upon, almost immediately.

Colliery and quarry practice often provide surgeons with casualties, not unlike those in military work; in both a morphia and atropia tablet relieves pain and shock as nothing else will. Paulson knows that they were extensively used during the South African war, and have found their way into ordinary practice, entirely on their own merits. Their adoption by the services would, he is certain, be of inestimable benefit. An apomorphia disc, administered in the way indicated, will induce vomiting at once. Compared with hypodermic injection, the sublingual method is quicker, easier, safer, cleaner, and more reliable.

Who has not, in an emergency, been annoyed by the cleaning of the spoon, dissolving the tablet, freeing and fixing the needle, drawing in the solution, cleansing the skin, and then the injection, generally into fatty and feebly absorbent positions?

EDITORIAL.

FRESH AIR IN THE TREATMENT OF PNEUMONIA.

Readers of the THERAPEUTIC GAZETTE will recall that we have called attention on more than one occasion to the value of outdoor air in the treatment of croupous pneumonia, and have expressed our belief that the institution of the outdoor treatment for these cases by Northrup marked a distinct advance in the treatment of a disease which has never done much credit to the medical profession. During the past year we published an article by Dr. Northrup supporting his views. There has also appeared a contribution which would seem to indicate that scientifically obtained records as to the pulse, respiration and blood-pressure fail to support the clinical observation that this method of treatment is markedly advantageous.

In the *American Journal of Diseases of Children* for November, 1916, Morse and Hassman, of Boston, point out that, largely because of Northrup's work ten years ago, a large number of clinicians have been treating pneumonia, both in adults and in children, by the outdoor method. They have attempted to carry out careful investigation as to the influence of being out-of-doors upon 32 children who were suffering from pneumonia, making in all 387 observations. The children varied in age between two and ten years, and eight of them died. The illness was classified as very severe in three; severe in fourteen; moderately severe in four; and mild in three. Although the mortality rate in this particular series was slightly above the average it has no significance, as rates based upon a small number of cases possess little value in a disease which varies so greatly in virulence and in the susceptibility of the individual.

On looking over this contribution it would seem to us that one important factor has not been adequately considered. The term pneumonia is a very elastic one, but is generally employed to signify croupous pneumonia or catarrhal pneumonia. Now,

croupous, or lobar, pneumonia in children is a disease which rarely produces a fatal result, except as to sequela, notably empyema. On the other hand, catarrhal, or lobular, pneumonia is one of the chief causes of death amongst young children because of its frequency and its high mortality rate. Furthermore, it is important in a research of this kind to have information as to whether the illness is primary or secondary, since catarrhal pneumonia complicating or following measles or some other infection is quite a different malady from a primary attack.

The research quoted consisted not in studying two series of cases occurring simultaneously, one series being treated indoors, another outdoors, but by changing the treatment, the children being put out-of-doors for a varying number of hours, brought back into the ward again, put out again, and so on. It does not seem to us that this is a fair method of testing a plan, although it may be the proper method for determining whether being outdoors for a given period produces any changes temporarily in vital function. So far as the general course of the disease is concerned it might be compared to treating a series of cases of typhoid fever by the use of the Brand bath twelve hours out of the twenty-four and the administration of one of the antipyretic drugs during the other twelve hours out of the twenty-four. However, observations made by clinicians who are as careful and who have the reputation of these two authors deserve our careful consideration, the more so as conclusions which they draw are evidently not biased. They found that the blood-pressure, systolic and diastolic, was higher if the children had been in the warm air of the ward for some hours than if they had been out in the cold, but they add that the variations were, as a rule, so slight that they were within the limits of possible errors in observation. Again, they conclude that there is no definite relation between either systolic and diastolic pressure or the pulse pressure and

the severity of the disease, which we think is not remarkable in view of the fact that estimations of blood-pressure in children are never very satisfactory and always fail to give us information which can be compared to records obtained from adults. Morse and Hassman found, however, that the pulse-rate was lower out-of-doors than in the ward, as a rule, although occasionally the reverse was true.

Apropos of what we have already said about alternate methods of testing, their statement that the pulse-rate was usually lower when the patients had been out for twelve hours, or more, than when they had been out for a few hours, is important. They did not find that the temperature of the air had any constant effect on respiration, but they did find that the respirations were slower out-of-doors than in the wards, as a rule. It would seem that any method of treatment which saves the energy of the two vital functions of the heart and respiration is essentially advantageous, and this thought is emphasized by the statement of the authors that the impression of the house officers and nurses, who were constantly with the patients, was that in general the children were more comfortable out-of-doors than in the ward. They thought that they coughed less, were quieter, had a better color, and took their food better out-of-doors than when they were inside.

It would seem to us that no better tribute to the value of the outdoor method could be obtained than this, and we are therefore a little surprised that Morse and Hassman add to this statement that these observations "were merely their impressions and are, therefore, of little or no scientific value." The physician of experience well knows that impressions as to the general state of a patient are often much more valuable than isolated records obtained by instruments of precision. The authors admit that their study does not justify them in expressing any opinion as to the effect of the cold-air treatment on the mortality of pneumonia in children, but, in concluding their article, they express the view that the

patients seemed more comfortable, and after all this is what we think is most desired by the active practitioner. Our great confidence in this plan is therefore unshaken.

BOILED MILK VERSUS RAW MILK IN INFANT FEEDING.

Even before the medical profession knew anything about bacteria the question as to whether boiled milk and raw milk had an identical nutritional value was actively discussed, and it was thought by every housewife that boiled milk was more constipating than raw milk. In the early eighties Randolph carried out a series of experiments upon adults in which he thought he proved very conclusively that boiled milk was not as digestible as raw milk, and since that time, with the improvements that have been made in studying digestion, a large number of other investigations have been carried out along somewhat similar lines with contradictory results. It has been increasingly evident that pasteurization has limited advantages. While it is true that pasteurization destroys, or inhibits, pathogenic organisms which the milk may contain at the time that it is subjected to moderate heat, it is also true that all the germs are not destroyed, and if the milk is kept, except under the most favorable conditions, for any length of time these organisms, which have been temporarily inhibited in their reproduction, multiply rapidly. Furthermore, it would appear that they multiply more rapidly in milk which has been pasteurized than they do in raw milk, the surrounding conditions being identical. The deduction from this is that boiled milk—that is, milk which has been subjected to a temperature sufficient to actually destroy germs—is in reality sterile and correspondingly advantageous. Any advantage gained from this point of view, however, is counterbalanced by the fact that the boiling of milk certainly alters certain of its qualities, and some think destroys vital properties which are advantageous to the young.

This subject was discussed in an interest-

ing way by Brennemann at the 1916 meeting of the American Medical Association. He pointed out that in European countries milk is almost universally boiled, because raw milk is not considered a safe infant food. He thinks, apparently, that any question of raw milk containing vital properties or ferments which are destroyed by boiling is largely theoretical, although he admits that boiled milk is more constipating than raw.

Concerning this point, namely, that boiled milk is supposed to be more constipating than raw, Brennemann seems inclined to believe that it corrects loose stools by being more easily digested than by exercising any constipating influence, and it is possible that giving boiled milk, which is sterile, permits the child to overcome the bacteria already in the alimentary canal, which it would be unable to overcome if it got a fresh army of microorganisms.

Any tendency to scurvy which certain physicians have thought to be more commonly developed when boiled milk is used can probably be set aside by the occasional feeding of beef juice or the employment of orange juice; also there is little evidence that scurvy can be produced by boiled milk.

Summing up his clinical experience, Brennemann says that there is no doubt in his mind that artificially fed babies are in general harder to feed on raw milk than on boiled milk, and this is true not because of bacteriological influence, but because he thinks that boiled milk is more easily digested, raw milk coagulating more rapidly in the stomach in large masses than does boiled milk. Brennemann thinks that all babies fed on raw milk will occasionally pass hard, bean-like curds in the stools which bear no resemblance to ordinary fat curds, and that this is not true to the same extent in children who are fed on boiled milk, the curds they pass, under these circumstances, being much smaller and less hard.

Finally, as his conclusion from a consideration of the entire subject, Brennemann expresses the view that if milk boiled two to five minutes in the consumer's home were

as popular to-day as is raw or pasteurized milk, babies would suffer less.

From the discussion of Brennemann's paper it would appear that most of his hearers took similar views, the most notable exception being Kerley, who, however, while advocating the use of raw milk, added the qualifying clause that when safe raw milk cannot be secured the milk should be boiled regardless of who uses it, when or where. Kerley stated in addition that cooked milk is more readily digested in young babies than raw milk, and that milk cooked with starch is suitable food for delicate infants. In many instances it would appear that evaporated milk cooked with a starch will suit the infant when raw milk will not. Altogether at the present time it would seem that the vogue of cooked milk is in the ascendent.

THE QUESTION OF TONSILLAR OPERATIONS.

The readers of the THERAPEUTIC GAZETTE will recall that on a number of occasions during the last three years we have published editorials and progress articles dealing with this important and very active topic, and we have published, amongst the original articles, a symposium in which the pros and cons of tonsillectomy were debated. That there is far too much operative procedure upon the tonsils seems to be universally recognized by those who are best qualified to judge. Gradual recognition that certain endocardial and joint lesions have their origin in some focus of septic absorption has led many men to believe that the tonsils were the offending members and that these glands should therefore be removed. There can be no question that this is the correct view in some cases. There can also be no question that in many instances perfectly normal tonsils are removed, or at least tonsils which if not perfectly normal are not abnormal in the sense that they are doing any harm, but are only scarred veterans of a series of infection battles in which the tonsillar tissue has won the fight.

In this connection we may quote the words of French of Brooklyn when he says, "While all diseased tonsils should be enucleated, it is probably safe to say that eighty per cent of enlarged tonsils do not contain foci of infection and, therefore, do not need to be completely removed, and, indeed, unless obstructive to voice or respiration, do not need to be removed at all." This viewpoint is emphasized if we recall the fact that certainly in the young the tonsils apparently have an important function to perform, and that in older persons they may be considered as barriers against infection.

In this connection we have read with interest a communication by Pottenger, who is interested in this subject from the viewpoint of the student of tuberculosis. He believes that the tonsils are, in a goodly number of cases, distinct protective barriers, as are all lymphoid structures, and, in the discussion of his paper, a number of clinicians side with him in protesting against the promiscuous removal of tonsils.

It would seem that it will not be a long time before we will reach what may be called the "resting point" in regard to this matter. This "resting point" with our present information is so readily discovered that it is remarkable that it has not been arrived at earlier, and it would seem to be this, that where septic foci exist in one or both tonsils, or where repeated attacks of severe tonsillitis show that these tissues are unduly vulnerable, the tonsils should be removed, but that all tonsils which do not seem absolutely normal should not be removed. In some instances where the general practitioner refers a patient to the specialist for tonsillar removal, the specialist removes the tonsils because the patient's physician has stated that he considers it essential, and the specialist naturally believes that the medical man, who is most familiar with the patient, is best qualified to determine what should be done.

In all these cases it should be borne in mind that removal of the tonsils is not so simple a proposition as many people seem to consider it. It involves the use of a general anesthetic, which is somewhat dan-

gerous, and which not infrequently leaves the patient's nervous system somewhat shaken and abnormal, and if an attempt is made to operate under local anesthesia, it occasionally happens that very alarming or even fatal results follow the application of the local anesthetic. Last of all, damage to the pillars of the fauces may result in permanent changes in the resonance of the voice. Tonsils, it would seem, ought to be removed, if they are guilty, but a fair trial as to their guilt should be had and a careful judgment reached before they are executed.

BACTERIOLOGICAL AND EXPERIMENTAL RESEARCHES ON GAS GANGRENE.

The success attending prophylactic injections of antitetanic serum naturally suggests a search for a similar remedy against gas gangrene, the principal cause of mortality in the early period of the war and still constituting a major menace to the wounded soldiers, the now higher percentage of recovery being attributable to a more thorough application of the underlying principles of the surgery of infection—i.e., due to a freer and more rational drainage rather than to newer methods of treatment, or newer and more potent antiseptics.

The bacteriologists have shown that gangrene of a part is not necessarily a sequel of gas gangrene infection, since prompt treatment usually averts it, nor in accordance with clinical experience is superficial emphysema a necessary symptom. High temperature or somnolence, or both, and toxic symptoms in general are always well marked toward the close. Even a putrid odor is not always apparent, this fact being due to other organisms of a lower pathogenesis.

Weinberg (*Proceedings of the Royal Society of Medicine*, July, 1916) notes that sometimes when the discharge from a bad case of gas gangrene is examined, it is found that only one organism is present, namely, the bacillus aerogenes capsulatus described by Welch, now usually called the bacillus perfringens. These, however, are

exceptional cases. There is usually an associated diplococcus; often many other organisms, such as streptococcus, bacillus proteus, and bacillus sporogenes, the latter being a common infection and the one which generally sets up putrefaction. The bacillus refringens is found in nearly two-thirds of the cases of gas gangrene, or gas phlegmon. There is another (vibrio septique) combination of microbes in which the bacillus of malignant edema is the chief pathogenic organism.

Of one hundred cases examined the vibrio septique was found only in four. By many other authors doubtless this bacillus has been confused with the bacillus sporogenes, which like the vibrio septique is motile. Experimentally the vibrio septique develops much less gas in the tissues than does the bacillus perfringens. It is very easy to show how artificial injury of muscle and hemorrhage favors the infection in question.

As to treatment, since the flora of gas gangrene is the same in almost every wound and since a wound may become sooner or later, even a very long time after infection, the starting-point of a grave gas infection, it is evident that early energetic treatment is indicated. This implies prompt treatment; and coincident with increased efficiency of the medical service the number of gas gangrene cases has lessened.

The most essential condition of efficacious treatment is to open the wound immediately as widely as possible, to extract the projectiles and particles of clothing, to cut away all gangrenous tissue, and when a fracture is present to remove all the fragments of bone.

Vaccine has been used, and though not universally accepted has been highly commended by those who have employed it.

The preparation of active serum seems promising. Horse serum prepared by immunizing horses to the perfringens has relatively small activity. Its use according to the author has seemed to be beneficial to certain cases of gas gangrene. The antitoxic serum obtained with the toxin of the vibrio septique or bacillus oedematiens

should have a greater preventive and curative action. In animals it is very difficult to cure even in as short a time as half an hour after one fatal dose of toxin has been injected intravenously. It is true that the number of pathogenic organisms of gas gangrene found increases as technique improves and research continues. At the same time the problem becomes more complex. None the less it is not necessary to prepare sera against all the pathogenic microbes found in gas gangrene. It is sufficient to retain only the species most universal and at the same time most pathogenic. These number but three or four: bacillus oedematiens, bacillus perfringens, vibrio septique, and perhaps the organism described by Sacquepee. The plan would be to prepare in the same horse an antipolytoxic serum active at the same time against all these organisms. Experiments have not shown this to be possible. It is possible, however, to prepare separately sera active against each of these species, the sera then being mixed. According to the author's opinion the best method of dealing with a case of gas gangrene, is to inject immediately into the wound and the neighboring tissues a mixture of the sera of the three most pathogenic microbes. The rapid bacteriological investigation then made by an expert will show which serum must be continued.

Weinberg calls attention to the fact that in the preparation of vaccines the time element enters. Therefore the use of omnivalent iodized autovaccine from the wound discharge is advised; this can be prepared in one or two hours. Several injections are made daily or every two days. There is no united opinion on the value of these vaccinations, or indeed of the sera, but the attitude of those who have used them both seems to be distinctly favorable.

The author also speaks of iodizing the wounds, by which he means laking, after having dried out the wound, with iodine 1 grm., potassium iodide 2 grms., water 1 liter. The lower opening of the wound is temporarily plugged. This solution is left in contact for fifteen minutes or longer if a rapid bacteriological examination has shown

the presence of spores. The wound is then gently dried out and filled with dry gauze. It is held that by this rational method of treatment the iodine will not only act as an antiseptic, but will transform the microbes with which it comes in contact into a vaccine. Thus, he holds, we are treating the patients with iodized vaccine prepared *in vitro* and *in vivo*.

Weinberg states that the results of recent researches on gas gangrene have confirmed the great importance of intestinal flora and have shown that there exist in the ground, in mud, and in dung a large number of new microbes most pathogenic to man and sometimes as toxic even as the bacillus tetani. This enables us to understand the etiology and evolution of the different forms of gas gangrene, and at least points the way toward researches which will ultimately lead to a solution of the problem.

THE TREATMENT OF INFECTED WOUNDS.

It is interesting and at the same time somewhat discouraging to note that the intensive study of the best scientific minds in the world has as yet failed to evolve a treatment for infected wounds so clearly and demonstrably effective as to have received general acceptance and universal application. The most promising is probably Carrel's method of applying hypochlorite solutions. The essence of this method is not drainage, but a laking of the entire affected area every two hours. Indeed, some enthusiastic observers feel assured that this treatment properly applied is so entirely efficient for what has heretofore been the bane of surgery that the enormous expenditure of life and efficiency entailed by the conflict will be offset by this great boon. The proof of the universal applicability and complete efficiency of the Carrel method is apparently still wanting even in the minds of those whose opportunities for observing and knowing its results are adequate.

Thus in the *Annus Medicus* for 1916 published by the *Lancet*, December 30,

1916, under "Treatment of Wounds," it is stated that the method most widely known and received is that introduced by Sir Almroth Wright, who irrigates and dresses with a solution of hypertonic salt, the citrate having been found to be unnecessary. The main function of this dressing is to stimulate the effusion of lymph from the walls of the wound. This lymph possesses important antiseptic powers and also contains leucocytes possessing phagocytic properties. The next most popular application to wounds is a hypochlorite solution. Carrel's special method is mentioned somewhat casually. Chloramine, introduced by Dakin, is said to be five times stronger than the original solution. It is interesting to note that the use of iodine in wounds is now completely discredited and is but little employed. Among other methods is mentioned magnesium sulphate and glycerin; those who have seen its action have expressed themselves as very well satisfied with the results obtained. Hull has introduced the use of salt sacs by which the wound is filled with salt, thus perfectly draining it by osmotic action, the dressings not requiring change for a week.

Solution of salicylic acid, about two drachms of a saturated alcoholic solution to a pint of water, is also found to be an effective lotion. Salicylic acid and gelatin is mentioned, and picric acid; whilst, finally, authority is quoted for a very successful use of vaccines from Swan's article, who makes it a rule that every case arriving from overseas with a septic wound shall, on entrance into the hospital, have an initial dose of a mixed polyvalent vaccine of proteus and streptococcus.

Doubtless if one could converse with either the formulators or users of any of these methods he would find in each case a similar degree of confidence in the method employed, and perhaps results which were good in proportion to the surgical judgment of the individual operator rather than to his choice of an antiseptic.

All we can say at present is that the Carrel method with the Dakin solution seems to give the largest promise.

REPORTS ON THERAPEUTIC PROGRESS.

PARACENTESIS PERICARDII.

In the *Boston Medical and Surgical Journal* of October 26, 1916, LOCKE asserts that whether for diagnostic or for therapeutic purposes aspiration of the pericardium is a procedure altogether too little known. During the past ten years many authors have urged the more frequent employment of paracentesis in pericardial effusions, and in consequence it is now unquestionably much more often done than formerly.

Considering the relative frequency of pericarditis, and its favorable course with spontaneous recovery in many instances, it must be admitted that paracentesis is rarely necessary. It is indicated when the amount of effusion is so great as to give extreme embarrassment to the respiration and circulation and thus endanger life, or when a large effusion shows no tendency to absorption. In occasional cases it is important to establish the nature of the effusion, especially when a purulent exudate is suspected. Sears has emphasized the importance of exploratory puncture in all suspected cases of this type, urging the advantage of early radical treatment of pyopericardium on the same grounds as of pus in the pleural cavity. The favorable results of surgical treatment by pericardiotomy during recent years offer a weighty argument for early aspiration for diagnosis.

Puncture of the pericardium is far less simple than of either the pleural or peritoneal cavities and is by no means free from danger. A dry tap is not infrequent even when a considerable amount of fluid is present—a failure which is explained by the fact that adhesions binding the heart to the pericardium may make it difficult to reach the fluid, or because the exudate is apt to contain a large amount of fibrin with which the needle may become plugged. The *x*-ray examination is often of great value in indicating the position of the fluid in the pericardial sac.

The possible untoward results of para-

centesis of the pericardium are several. A few cases are on record of sudden collapse and death immediately following it. The dangers of infecting the pericardium are but slight and can be disregarded if strict attention be given to asepsis. An ever-present possibility is the puncture of the pleura and infection of this cavity if the pericardial exudate is purulent. The gravest complication, but, fortunately, a rather rare one, is the wounding of the heart, leading to fatal hemorrhage. Boxwell reports such a case, in which the ventricle and auricle were punctured and death resulted from hemorrhage. The dangers from this cause seem to be not so much from puncture as of tearing of the heart muscle by movement of the heart over the end of the needle.

The question of the best site for aspiration is a matter of wide difference of opinion, and a great variety of points have been recommended. From the work of Zinn, Blechmann, Schaposchenko and Damsch, and others, it is clear that the least amount of the effusion collects in front of the heart, the bulk of the fluid being in the posterior and left dependent portions of the pericardium. The right side of the diaphragm meets resistance from the liver and cannot be pressed down as on the left, where the resistance is less, and therefore the accumulation of exudate in the right lower part of the pericardium is usually small in comparison. This would seem sufficient reason for not choosing the fifth right intercostal space (Roth's point) as the site for paracentesis. Likewise for the same reason the various points to the left of the sternal border, either inside or outside the internal mammary artery, are unsuitable. Furthermore, the dangers of wounding the heart are greatly increased in this region.

The region most commonly chosen (Curschmann, Zinn, West, Sears, and many others) is the fifth or sixth interspace, 2 to 3 cm. outside the nipple line and inside the outer limits of dulness. The position is one

of the most favorable for drainage of the pericardium, and the chances of injury to the heart are very slight. The needle introduced at this point may transfix the pleura, but this accident is of little or no importance.

One other point of puncture has come much in favor of late, namely, the sub-xiphoid space of Marfan. The advantages of this method as stated by Marfan are as follows: (1) The distended pericardial sac lies very close to the xiphoid and is very easily entered; (2) the sac is punctured at its lowest part and can therefore be more easily and completely drained; (3) there is no danger of injury to the heart; and (4) there is no possibility of entering the pleural cavity. Blechmann and Rieux believe this to be the most satisfactory and safest method.

EXERCISES TO AID DIGESTION, PREVENT CONSTIPATION, AND STRENGTHEN THE ABDOMINAL WALL.

In the *New York Medical Journal* of October 28, 1916, MOSHER gives these directions:

1. Lie on the back (bladder empty and knees bent). Gently stroke the abdomen downward six times along the inside of the left groin, from ribs to pelvis.

2. Stroke three times across the abdomen on the navel line from top of the right groin to top of the left, then downward as in Exercise 1.

3. Draw the lower abdomen forcibly inward by muscle contraction (not by breath), and imitate the movement involuntarily made in taking a long restful yawn—breathe in slowly all the air possible, stretching the trunk and neck upward, then as slowly breathe out all air taken in. Repeat six or eight times. This exercise can also be taken in the sitting or standing posture and should be repeated often when enteroptosis is present.

4. Forcibly draw in the lower abdominal wall (not by breath but by muscle contraction), then raise it and hold long enough to count ten. Do this three times. Rest and repeat.

If the abdomen is distended by gas, insert a small tube (the rectal point of a syringe) into the rectum before beginning the exercises; if retained, it will let out the gas as fast as it is carried down. Never apply pressure below and to the inside of the right groin (region of the appendix).

These exercises should be taken by every one on retiring, to overcome the sagging of abdominal organs due to the standing and sitting posture. They may be repeated half an hour or more before meals, if indigestion and gas are present.

FUNDAMENTAL PRINCIPLES UNDERLYING THE TREATMENT OF HEART DISEASE.

In the *Journal-Lancet* of October 15, 1916, GREENE says that a factor vital in the consideration of cardiovascular disease is the simple but fundamental fact that, however important the detection and specific differentiation of valvular lesions may be, the vital matter is always the condition of the heart muscle itself—whether its defects be due to a myocarditis, chronic degeneration, or a congenital myocardial asthenia.

Yet another relates to the mental attitude of the student or practitioner at the time of undertaking any examination of the heart. It is to be feared that too often this involves, primarily, the mere question of murmur or no murmur. The result is likely to be in many instances a total failure to appreciate the most significant alterations in the quality and accentuation of heart-sounds on the one hand, and to exalt the importance and specific significance of a cardiac bruit on the other. The fundamental purpose in any such undertaking is the establishment of the presence of normal heart-sounds, and if this be the habit of mind, the detection of any existing murmur is rendered doubly certain.

It is possible that the great importance and peculiar value of the long-focus radiograph and of the characteristic variations in the cardiac profile which it reveals are not sufficiently appreciated. The information thus obtained is so great, with respect both to diagnosis and the effects of treat-

ment, as to make its frequent use obligatory on the part of any one who owns or has ready access to an x-ray apparatus.

With respect to the effects of treatment, tentative or formal, one cannot avoid a few words as to the proper and improper use of digitalis, the king of drugs in this field, which, in pronounced cases, finds its greatest value when given the advantage of initial associated physical rest on the part of the patient. Not only are we able repeatedly to demonstrate grades of dilatation falling within the normal limits of the cardiac profile by means of the response of the outline to digitalis, but to yet greater degree and with almost as much illumination in obscure instances is the effect produced by such simple and harmless measures upon the subjective symptoms of cardiovascular insufficiency.

Greene has but these few words of advice to offer: "Use a standardized preparation of maximum reliability and potency, and drive the primary effect home by full doses carried only to the point of producing a definite physiological effect; then withdraw the drug for a few days, and repeat the process as often as may be necessary and over as long a period. Unless impelled by absolute necessity, do not place the remedy in the hands of a patient at a period when the results of adequate administration demand careful medical interpretation, for it is certain to be either over- or under-used, with resulting disappointment to all concerned. The effect of very small long-continued doses, administered after the primary purpose is achieved, is sometimes surprising, but these also should receive some measure of supervision."

Finally, a word as to the general attitude of medical men toward especially serious or apparently hopeless cases of cardiovascular disease. A traditional attitude of hopelessness leads to the abandonment of many cases long before such a step is necessary, and involves the loss of many opportunities to win a victory in the face of what may seem certain defeat. Quite as striking, and no less disastrous, is the assumption that little can be done for the disease of

the primary degenerative type which occurs in elderly people. Many a fine old gentleman is permitted to drift along with steadily but almost imperceptibly failing faculties and strength when a little care and treatment at the proper time, and repeated as may be necessary, will greatly prolong his life, and for considerable periods retard the sequelæ of the senile degenerative type.

Greene does not wish to be understood as asserting that organic heart disease is curable or always remediable. He does assert, upon the basis of years of practical application of the principles here enunciated and with all his strength, that at the present time the cardiopath is not receiving at the hands of medical men either the comfort or the length of days readily obtainable in a great majority of instances by the intelligent application of modern methods of diagnosis and treatment.

IMMUNE HUMAN SERUM IN THE TREATMENT OF ACUTE POLIOMYELITIS.

In the *Journal of the American Medical Association* of October 21, 1916, WELLS writes on this topic. He reaches the following conclusions:

1. The administration of immune serum in acute poliomyelitis is based on recognized principles of immunity.

2. Because the lesions are not confined to the nervous system, and because the lesions therein consist essentially of perivascular infiltration, intravenous injection of serum appears to be a rational procedure, either alone or in combination with intraspinal injection.

3. Intravenous injections of serum should if possible consist of doses of from 50 to 100 Cc. or more daily.

4. Following intravenous or intramuscular injections of serum, spinal fluid should be withdrawn.

5. Intraspinal injection of serum usually produces an increase in the number of leucocytes with increase in the proportion of polymorphonuclear cells in the spinal fluid.

6. No ill effects have followed the use of

serum in this series, either by intravenous or intraspinal injection.

7. In all cases after intravenous injection, and to a less degree after intraspinal injection, a noticeable improvement usually occurred, which unfortunately, however, in some cases was only transient.

8. Early administration of the serum is urged, necessitating therefore an early diagnosis of the disease; in severe cases late administration of the serum has produced little if any noticeable influence on the course.

THE RELIEF OF BREATHLESSNESS IN SOLDIERS SUFFERING FROM IRRITABLE HEART.

The *British Medical Journal* of October 14, 1916, contains an article prepared by six medical men on this topic. The object of the present paper is to draw the attention of those charged with the care of military patients to a subtle cause of breathlessness. The reason for their doing so is that they have found it to exist in five of six cases in which the cause of the breathlessness present was so far in doubt as to make a systematic examination of the chemical properties of the blood desirable. The cause of breathlessness to which they refer is the absence of an adequate supply of "buffer" salts in the blood. The patients in whom this condition is present are to be found amongst those who are diagnosed as having "irritable hearts" or "trench hearts"—that is, among the number of soldiers invalided during the period of training or while on active service because they are unable to tolerate physical exercise. In these cases exertion produces some of the following symptoms, namely, excessive fatigue or actual exhaustion, attacks of giddiness or actual fainting, palpitation, and pain usually situated in the precordial region. The patients to whom they refer show no constant physical signs, but in the majority of them the heart-rate is abnormally high when the subjects are up and about. Moderate exercise increases the pulse-rate excessively. It is the rule to find high respiratory rate in these subjects while they

are at rest, and in some cases this rate may be as high as 40 per minute.

The "buffer" salts play an important part in the pathology of the cases under consideration.

The blood is at all times receiving and parting with acid and alkali. These variations in constitution, if effected in an ordinary saline solution, would produce changes in relative acidity and alkalinity which would be physiologically intolerable; their effect on the brain alone would be to excite or depress its various centers to extreme limits. The respiratory center, for instance, would be stimulated to violent dyspnea by the acidity resulting from trivial exercise; it would be brought to a standstill by a moderate acquisition in alkali. A given addition of carbonic acid to the blood only produces a quarter of the change in reaction which it would produce in a corresponding quantity of physiological saline solution. Thus, if 100 Cc. of blood should be taken and the same quantity of normal salt solution, 1.3 Cc. of carbonic acid dissolved in the saline would change its reaction to the same extent as 5 Cc. would change that of the blood. The reason of this is that the blood contains such substances as sodium bicarbonate, monacid and diacid sodium phosphates, and protein, which tend partly to fix the acid so that in a sense it loses its chemical freedom. For the sake of example the attention may be confined to the two phosphates, Na_2HPO_4 and NaH_2PO_4 . If a little carbonic acid is added to a solution containing these two salts, a little sodium bicarbonate is formed, which is alkaline. The sodium is acquired by the CO_2 at the expense of the phosphates, so that there is less of the alkaline Na_2HPO_4 and more of the acid NaH_2PO_4 than before. The net result is a slight increase in the acid reaction. The blood forms a more complicated system of this type. The salts to which they have alluded are therefore called "buffer" salts, because they ease the shock to the reaction of the fluid caused by the addition of acid or alkali.

The bearing of these general observations on the cases of breathlessness which they

have studied is perhaps best explained by recounting the history of their investigation of a single case. The results were as follows:

1. That when all the CO_2 was shaken out of the blood it was somewhat more alkaline than normal blood.

2. That with the amount of CO_2 normally present in the body it was just on the acid side of normal; and

3. That any further addition of acid increased the acidity to an abnormal degree.

These observations seem to the writers to be important, first of all because they demonstrate an altered state of the blood, which goes far to explain the otherwise inexplicable breathlessness in certain patients who suffer from the condition described as irritable heart. They are important from another standpoint: the temptation to cover our ignorance of the pathology of the malady as a whole by referring many of its symptoms to instability or to irritability of the central nervous system was a powerful one, so long as clear deviations from normality could not be found. These investigators think that their observations carry us from the abstract to the concrete, and tell us that we deal with an affection in which disordered metabolism plays a conspicuous rôle.

[The conclusion from a practical standpoint would seem to be that such cases may be benefited by the intravenous injection of a 4-per-cent solution of sodium bicarbonate.—Ed.]

THE ANTAGONISM BETWEEN ATROPINE AND CERTAIN CENTRAL EMETICS.

In the *Journal of Pharmacology and Experimental Therapeutics* for October, 1916, EGGLESTON gives the results of a series of experiments on animals and concludes:

1. Experiments on dogs have shown that pilocarpine, nicotine, morphine, apomorphine, emetine, aconitine, and ouabaine produce vomiting through direct stimulation of some portion of the central vomiting mechanism.

2. In dogs small doses of atropine, given

shortly before or together with pilocarpine, or nicotine, prevent the emetic action of both of these drugs, but not that of the other drug mentioned.

3. Doses of atropine similar to those which antagonize the emetic action of nicotine and that of the smaller doses of pilocarpine are too small to cause demonstrable effects in dogs when given alone.

4. The doses of atropine effective against the emetic action of pilocarpine, in whatever dose used, fail to antagonize such other actions of pilocarpine as stimulation of the salivary and bronchial glands, of intestinal peristalsis, and of the bladder to contraction.

5. The ratio of the antagonistic dose of atropine to the dose of pilocarpine was determined for the minimal emetic dose of the latter and for each of several multiples thereof.

6. The effectiveness of the antagonistic action of atropine toward pilocarpine increases progressively as the doses of both drugs are raised, so that while the ratio of atropine to pilocarpine is 1:75 for the minimal emetic dose of the latter it is 1:125 for eight times the minimal dose. Or, when the minimal dose of pilocarpine is raised eight times the dose of atropine has to be increased only about five times to antagonize its emetic action.

7. Hyoscyamine is nearly eight times as active as atropine in antagonizing the emetic action of pilocarpine.

Finally he believes that:

1. Atropine and hyoscyamine are capable of antagonizing the vomiting produced in dogs by some central emetics—pilocarpine and nicotine—and are incapable of antagonizing that of other central emetics—morphine, apomorphine, aconitine, emetine, and ouabaine.

2. The antagonism of atropine or hyoscyamine toward the emetic action of pilocarpine and nicotine is not of a chemical nature, but is physiological and takes place upon the center.

3. The observations suggest a complexity of the vomiting center, including at least two different points of action, or sets of re-

ceptors, for chemical stimuli. The one is stimulated by pilocarpine and nicotine and depressed by atropine. The other is stimulated by morphine, etc., but not by pilocarpine and nicotine, and is not depressed by atropine.

BACTERIAL VACCINES IN TREATMENT OF PULMONARY TUBERCULOSIS.

The *Journal of the American Medical Association* of October 21, 1916, contains an article by BONNEY in which he discusses this subject. He well emphasizes the fact that even when apparently characteristic evidences of mixed infection are present, an element of real doubt as to the propriety of vaccine therapy is unavoidable, as the syndrome may, after all, be of essentially tuberculous origin. Irrespective of these considerations as to pathogenesis, and with a just appreciation of the inevitable uncertainties of action, it appears, nevertheless, permissible to resort to vaccine therapy under the conditions enumerated.

In Bonney's experience the results obtained in a fair proportion of cases in which there was moderate fever have been such as to encourage its further cautious employment. No assurances as to its probable effect can be given, and patients should be made to understand that its use is largely experimental. Under a wisely directed management they have but little to lose from its trial and perhaps something to gain.

This is also true to a great extent in connection with its employment in afebrile cases. While the greater proportion of such invalids may be expected to make fairly satisfactory progress under proper supervision without recourse to vaccine therapy, occasional indications for its administration may be found in patients with distressing cough and abundant expectoration. Many of these cases without fever exhibit more or less cavity formation or bronchiectasis with varying degrees of fibrosis. Under these conditions, even if but slight loss of weight has taken place, the constructive change is necessarily slow, while if nutrition

is seriously impaired the difficulties of successful management are very considerable. The application of vaccines to patients of this class is quite appropriate and the results are sometimes gratifying. Bonney can cite numerous cases under his own observation in which the vaccines proved of appreciable benefit, and he can present a few rather exceptional instances of the remarkable improvement sometimes achieved. Notwithstanding these decidedly picturesque examples, which though impressive are infrequently observed, the facts remain that his own clinical experience suggests for vaccine therapy but a limited field of usefulness. As a routine method of treatment in pulmonary tuberculosis it cannot be too strongly condemned. As a special measure of occasional value, but often of doubtful utility, it appears worthy of a judicious trial in selected cases.

TREATMENT OF WEAK LABOR PAINS.

RUSHMORE in the *Boston Medical and Surgical Journal* of November 9, 1916, in discussing the value of pituitrin says that the results are not uniform, but that certain facts seem to be pretty well established. For example, the dose is about one-tenth of a gramme of the gland substance, corresponding to one cubic centimeter of pituitrin, but varying somewhat with preparations of other manufacturers. Increasing the dose above this quantity does not seem to increase the action, and such variations in result as appear seem to be due to variations in the susceptibility of the patients. For if the contents of a one-cubic-centimeter ampoule be divided equally between two patients, there may be a marked effect in one and no effect in the other.

It may be given subcutaneously, intramuscularly, or intravenously. While there is little difference between the subcutaneous and the intramuscular injection, the latter method is generally preferred. It should be given intravenously only in an emergency to check postpartum hemorrhage, for its action is not only almost immediate, but stormy and accompanied by unpleasant but

not serious general symptoms. By mouth it has no effect. After intramuscular injection the action is evident in from five to fifteen minutes, though sometimes later; if there is no reaction from the first dose in half an hour, a second may be given. But if no reaction follows the second dose, the patient is considered refractory and no further injection should be made.

The effect on the uterus during labor is peculiar and characteristic, producing a type of pains which closely resemble the normal. There is an increase in the uterine tone, with an increase in the force of the contractions, and a shortening of the duration of the contraction as well as the interval between the pains. The shortening of the interval is most marked at first, when the pains may occur in such quick succession as to give rise to a tetanic contraction of several minutes' duration. But generally no tetanus results, the interval, though short, being clearly defined. The effect lasts for about an hour, with its acme in the first half-hour, and is generally not followed by a period of noticeable relaxation. It seems more active the nearer the patient is to physiological term, and if in labor the nearer the patient is to the end of labor. But in inducing labor it is of no value.

In regard to its use after the birth of the child there is wide difference of opinion, indicating that more study and observation are necessary to clear up this aspect of the question. Its injection has been recommended at the moment of birth to diminish normal bleeding, and it is undoubtedly valuable for intravenous use in postpartum hemorrhage, where it acts promptly and uniformly. Thus it removes the need for intrauterine manipulation and to that extent diminishes the danger of infection.

Certain reports on the use of pituitrin would lead us to think of it almost as a panacea, with no failures, no bad effects, and no contraindications. But a more thoughtful study of cases and a review of the literature show that it sometimes fails and sometimes does serious harm.

The failures ought to be studied with great care. They may be divided into two

groups: first, those in which there was no uterine reaction—found chiefly in elderly primiparæ and in women with undeveloped uteri; second, those in which the reaction was not of sufficient force to produce the expulsion of the child. It is this second group that especially demands attention, for here are the cases in which the misuse has been most obvious.

The bad effects outside the uterus are occasional, but never serious, at least as hitherto reported, and consist of pallor, faintness, cyanosis, and irregularity of the pulse. The serious bad effects are in causing tetanus of the uterus, which has led to asphyxia of the child and occasionally to rupture of the uterus.

The indications for the use of pituitrin may be summarized briefly. Before it is administered a careful examination should be made to determine whether the child can be born through the birth canal. The cases of rupture of the uterus have come chiefly from the neglect of this precaution. If it seems probable that the child can be so born, pituitrin may be given, first, for uterine inertia in the first or second stage. It has been recommended for both primary and secondary inertia, but Rushmore is inclined to be very cautious in its use before the cervix is dilated two and one-half inches.

The second group of cases comprises several subdivisions: those cases in which labor pains are normal, but for some definite cause increased activity is needed, as in a breech and occasionally in a face presentation; if the disproportion between the presenting part and the pelvis is slight; to avoid exhaustion of the mother from undue prolongation of labor; in eclampsia in connection with dilating bag. The only indication that needs comment is the use in eclampsia. Some have feared the dangerous effect of the rise in blood-pressure, but this is not great, and Rushmore thinks we have a choice of evils, of which he considers the rise of blood-pressure less than the prolongation of labor. It may also be used as a prophylactic against bleeding in Cæsarian section.

A word should be said about adrenalin in this connection. Its effect in producing uterine contractions was noticed in 1901, but the study was not prosecuted with much vigor at first, and later interest was distracted by pituitrin. But it is the most powerful and promptly acting oxytocic that we have, causing contractions in dilution of one to two hundred millions, and producing a powerful effect in dilution of one to fifty millions. It is contraindicated during labor because it produces tetanus, but for post-partum hemorrhage it is prompt and efficacious though temporary in its effect. It is best injected into the uterine muscle, as intravenously it is dangerous and subcutaneously not very effective. Ten minims of the one-to-one-thousand solution may be injected into the wall of the uterus as high as may be reached on pulling down the cervix.

CONTROL OF SCARLET FEVER.

In the *Boston Medical and Surgical Journal* of November 9, 1916, LEWIS, Health Officer of New Haven, Conn., states that he has practically abolished recurrent cases, made infrequent secondary cases, and lessened reported cases, by demonstration of the carriers of convalescence and the carriers previously having had the disease, and by isolating these carriers.

Results of the so-called grading of quarantine do not depend on the quarantine, but upon the fact as to the presence of the carrier being within or without the family circle.

*Full liberty may be safely given to all contacts who are free from the signs of the disease at the time of isolation of the one sick and the carrier.

Control of scarlet fever will be found to lie in the supervision of those who have previously had the disease, at and during these periods when with intercurrent infections they again show the buccal-pharyngeal signs of scarlet fever. Secondly, missed cases and the convalescent reported cases are of equal importance.

THE MANAGEMENT OF POLIOMYELITIS, WITH A VIEW TO MINIMIZING THE ULTIMATE DISABILITY.

LOVETT writes in the *Medical Record* of October 21, 1916, on this topic. He deals first with the treatment of the acute phase—i.e., from the onset to the disappearance of tenderness. In this stage nature is attempting to repair the damage done to the cord, especially to the motor area. Rest and absence of irritation and of meddlesome therapeutics should constitute the treatment at this stage. There is no evidence that drugs are of any use, nor would one reasonably expect much from counter-irritation, external applications of heat or cold, or from electricity.

It is not physiological to irritate and stimulate the peripheral ends of nerves connected with affected and hemorrhagic nerve centers by massage and muscular exercise while the acute process, as evidenced by tenderness, exists. Joints will not be ankylosed, muscles will not hopelessly atrophy, and the patient will not become bedridden because he is kept quiet for as long a time as need be to enable the damaged cord to repair without interference. Deformities may occur in two or three weeks after the onset and must be prevented by support of the feet at a right angle (where the most common early deformity appears) by plaster-of-Paris splints or some similar simple contrivance. This policy of doing nothing is trying to the parents who have heard of the wonders of massage and of electricity and are anxious that no time should be lost, and trying also even to the experienced surgeon when the tenderness is of unduly long duration. There is evidence to show that hexamethylenamine prevents or delays the infection in monkeys, but no evidence to show that it is of use after the infection has occurred. Immersion in a warm saline bath is agreeable and apparently beneficial toward the end of this stage, and may be comfortably carried out by immersing the patient on a sheet. There is reason to hope that the administration intraspinaly of the blood serum of recovered patients as early as pos-

sible in the onset of the disease is a therapeutic measure of value in diminishing mortality and limiting the paralysis.

The treatment of the acute stage may be summarized as follows: Rest, the avoidance of meddlesome therapeutics, the prevention of deformities, and probably the early administration of the blood serum of immune patients.

As to the treatment of the convalescent phase, Lovett points out that during this period one faces squarely the question of muscular care and development. The destructive process has ceased, the harm has been done, the development of the possibilities of what remains is the problem. He believes that in this stage the amount of ultimate function is largely determined, and we must remember that nature is assisting us to the best of her ability with the great asset of spontaneous improvement, which is more marked in the first six months than in the second six, and more marked in the second six than in the last six months, of the two-year period arbitrarily allotted to this stage.

Perhaps certain data with regard to the gastrocnemius muscle may make clear what seems to Lovett to be the general behavior of muscles during this time. The calf muscle should normally be able to exert a force in pounds of from two to three times the body weight of the individual. This muscle is very frequently weakened by poliomyelitis. If it is partially paralyzed and is immediately protected by a high heel when the upright position is assumed, this throws it out of use in walking. If walking is restricted and if the muscle is judiciously exercised, in all cases that he has observed it has gained in muscular strength, and in two cases it has been quantitatively recorded as returning to the normal amount of power within two years. If it is not so protected and exercised, it has in all cases which he has observed lost power and stretched, with the acquirement of a calcaneus deformity of greater or less degree; whether it goes on to a complete loss of power cannot yet be said, because the quantitative observations on which these statements rest have

not yet covered a sufficiently long period. But what happens to the gastrocnemius muscle, which is easily measured and checked and observed, undoubtedly points to a general rule governing the behavior of other muscles not so easily observed and measured. So that in formulating the treatment for this stage the different reaction of this one muscle to protection and to overfatigue may be borne in mind as probably typical.

With regard to the specific treatment of this phase, when the tenderness has wholly disappeared, or at the end of six weeks or thereabouts in cases in which there has been no tenderness, the question arises whether we shall begin to get the patient up or whether we shall continue recumbency, and here there is ground for a perfectly reasonable difference of opinion, probably soon to be settled in New York City by the immense experience in the present epidemic.

Those who would keep the patient recumbent for months argue that in that way they avoid fatiguing the convalescent muscles, that the damaged nerve centers have ample time given them for complete recovery, and that muscle training and massage can be carried on perfectly well while the patient is in bed; all of which is perfectly true.

Lovett's own experience has led him, however, to feel that soon after the acute stage is over it is on the whole better to get the patient on his feet; that is, in about two or three months after the attack. The prolonged recumbency is not favorable to the circulation, which is intended to work at least some of the time in the upright position. The nervous system of children is not desirably affected by such prolonged confinement, and what is more important is that when the patient is put on his feet there is an instinctive effort to balance and hold himself upright, which exercises muscles not otherwise to be reached. But this ambulatory treatment must meet the objection that fatigue may be incurred by an attempt to get about, which is perfectly true, and this must be guarded against. If the people are not intelligent enough to

follow directions, prolonged recumbency would undoubtedly be the best treatment, provided, of course, that deformities were prevented. It has been too much the custom in the past to allow children to sit around for months and years with no treatment worthy of the name until they acquired the deformities of flexed hips, flexed knees, and dropped feet, all favored by prolonged sitting. Still, although this danger exists, it is not a serious objection to the treatment by prolonged recumbency properly carried out. The only danger is that the unqualified advocacy of prolonged recumbency might seem to sanction a method which has been productive of great harm in the past in the hands of inexperienced persons.

THE POSTFEBRILE TREATMENT OF ANTERIOR POLIOMYELITIS.

In the *New York Medical Journal* of October 14, 1916, ASHLEY states that it is generally conceded that the acute stage of this disease extends from the onset to the subsidence of pain and tenderness, a period varying from four weeks to three months, a time sufficient to establish grave deformity. It is apparent that orthopedic measures should be instituted by the physician in attendance during this period to combat or prevent deformity. All too frequently a tendency to deformity is started at this time that is irreparable. In this paper the writer accentuates three points:

First, the folly of no treatment in the postfebrile stages, while the patient still has pain in the nerve and the muscles are exquisitely tender.

Second, the importance of early treatment to combat deformity.

Third, the harmful effect of too much treatment, in all stages.

From our knowledge of the pathology of the disease we know that during the time immediately after subsidence of the fever there must be given a time to absorb the hemorrhage and perivascular infiltration which have compressed vessel and nerve cells to the point of occlusion on the one hand and death on the other. It is mani-

fest that irritation of these damaged, diseased nerve cells would be increased by a peripheral irritation or excitement.

This is the time to support the parts—to prevent stretching by weight of bed-clothes that would produce drop-toe, to prevent stretching of weak muscles and capsular ligaments and nerves by early sitting, standing, or assuming sprawling positions in bed, resulting in the drop-shoulder and the flail joint, the overextended hand or knee, the flexed knee or thigh, crooked spine, pendulous abdomen, etc.

This is the period of light diet, good nursing, warm, dry packs, sheet baths, rest in bed—firm, not too hard and not sagging—support of paralyzed parts by non-constricting braces, plaster-of-Paris, sandbags, etc.

There must be no massage, no electricity, no muscle training, no strychnine injections to irritate so long as pain and tenderness are in the muscles, pointing to an active disease still existing within the cord. At this stage any such measures are harmful in the extreme, and should not be administered until pain and tenderness have subsided—a time, as said before, varying from four weeks to three months.

In severe paralysis, especially, maintain the patient in the horizontal or inclined position for six months or longer. A Bradford or Whitman frame will permit daily excursions in the open air, when the patient may be turned over and placed at an angle to the horizontal position.

The value of prolonged recumbency is a debatable question. The patient's health should be closely observed and the horizontal or inclined position discontinued if the general health demands it. The writer is of the opinion that the disadvantages of recumbency have been exaggerated, when we consider the marked gain in weight by these patients and other children that demand the recumbent position, as in treatment of the tuberculous spine.

In the convalescent stage, beginning seldom before four or six weeks and lasting for six months to two years after the acute

attack, more therapeutic measures may be demanded. In severe paralysis the recumbent position is most highly recommended, as it prevents serious deformity of the spine. At this stage, if the patient assumes a position of deformity when standing, he should have a brace to enable him to walk, to support the drop-shoulder, the crooked spine, etc.

This brace should support without constricting the partially paralyzed muscles. The narrow bands, denting the weak muscles, are to be condemned. Use a broad webbing or leather cuff. Great care must be exercised through frequent observations to discover and combat any tendency to deformity by application of an efficient brace, shoes, or sleeping frame. As in the postfebrile stage, the limbs must not be permitted to dangle or assume positions that will stretch weakened muscles or take on contractures that would necessitate lengthening by surgical procedures to correct the deformity.

Massage at this period offers the greatest encouragement, and this massage should be given daily or twice a day. The parent is instructed to give the massage. It is the writer's opinion that much harm is done by too long and too vigorous massage. It was the teaching of Professor Lorenz that five minutes of massage to a limb was sufficient. More was harmful, being fatiguing to the patient and breaking down rather than stimulating or building up.

To the mind of the writer the object of massage is to stimulate and bring warmth by inducing an increased blood stream to the part and emptying veins and lymphatics. It is really feeding these muscles, and they should have two meals a day. They will not thrive on one large meal or even three meals a week. The masseur whom you send to give massage to your private patients generally spends an hour upon these patients—to earn his money—and he does more harm than good by breaking down more than he can build up, leaving the patient almost prostrated by fatigue.

In this connection Doctor Lovett, of Boston, has warned us of the ill effects of

fatigue, which must be avoided if we would not harm our patients. He calls attention to the fact that muscles are generally only partially paralyzed, the proportion of partial to complete being nine to one, and these are likely to be permanently injured by fatigue, an eventuality that should be carefully guarded against in administering massage.

Heat is another therapeutic remedy easily applied and should accompany the bath once a day. For the same reason as massage, it stimulates the blood stream. Hot baths of gradually increasing heat—the mother or nurse holding her hand in the water as more hot water is added; hot dry packs, warm, woolen clothes, two pairs of stockings, no restricting garters, flannel binder around the waist for the pendulous abdomen. Cold inhibits muscular movement, and is to be used only after a hot bath for a moment, followed by alcohol and water half and half and a vigorous rubbing or massage.

THE CLINICAL IMPORTANCE OF THE DETERMINATION OF SUGAR TOLERANCE IN MEDICAL PRACTICE.

The *Indian Medical Gazette* for September, 1916, in an editorial article states that there is little or no difficulty in recognizing a large excess of sugar in the urine: we are in possession of many methods and have at our disposal several eminently satisfactory tests. On the other hand, it is often a most difficult matter to decide, in doubtful cases, whether or not a condition of glycosuria is present. How very frequently do we obtain, by the ordinary clinical methods of examination, an indefinite or even suspicious reaction for sugar. In a very large number of instances these doubtful cases are passed over without further investigation; the reaction being ascribed to drugs, excess of urates, pigments, etc.; the true explanation in the majority of cases being often entirely unsuspected. Most authorities now agree that there is a very small percentage of sugar normally present in the urine; at the same time it is becoming more and more recognized that there is a preglycosuric

stage in diabetes during which the sugar content of the urine is rising, although the arbitrary methods of measuring the reducing power of the urine in such cases are not sufficiently accurate and conclusive to enable us to state dogmatically that the quantity of sugar present is in excess of the normal amount. There can be no doubt that most forms of glycosuria and diabetes have an insidious onset; any method, therefore, by which we can make certain whether the indefinite reaction obtained by Fehling's test means a greater than normal percentage of sugar in the urine—indicating a lowered tolerance to carbohydrates—should prove a great boon to practicing physicians.

In these instances of doubtful Fehling reaction, and they are continually occurring, it is most important to be able to say whether glycosuria is present or not; for, if there really is an excess of glucose, however small, it indicates that something is amiss with carbohydrate metabolism; it is a danger-signal which, if heeded and the proper treatment applied, may unquestionably enable us to stave off the incidence of an otherwise fatal diabetes. It is very generally accepted by clinicians that a diminution or total withdrawal of carbohydrates from the diet enables the organism to reacquire much of its lost power of carbohydrate assimilation, and it is just in the early stages of the disease—the preglycosuric stage—that the greatest benefit can be derived by a proper dietary control—*i.e.*, before the organism has begun to suffer severely from the toxic effects of excess of sugar in the blood.

By means of a very simple clinical test we are in a position to determine whether or not a patient, whose urine gives a suspicious Fehling reaction, is a potential glycosuric. It is only necessary to give the individual from 50 to 100 grammes of glucose, and if, after half an hour, the urine contains an appreciable quantity of reducing substance, we may be fairly certain that dietary control is necessary to prevent the gradual development of glycosuria and diabetes.

In accordance with the "dextrose paradox," or the "paradoxical law of dextrose"—the remarkable power of every non-diabetic organism to utilize dextrose in absolutely unlimited quantity—the normal organism is able to deal effectively with large quantities of glucose without sufficient appearing in the urine to give a positive Fehling reaction. In the non-diabetic, the vastly greater part of any dose of dextrose is retained; part of it is burned, as proved by the respiratory quotient, part of it is stored as glycogen, and part in other forms, and, from experiments carried out in connection with the diabetic inquiry in the Physiological Laboratories, Medical College, Calcutta, there is only an infinitesimal rise in the normal percentage of sugar in the blood.

In the diabetic organism the reverse is the case. In "total" diabetes, as after pancreas extirpation, doses of sugar do not affect the respiratory quotient; they do not cause any deposition of glycogen; they are quantitatively excreted. Both these powers are lost, so that the dextrose saturates tissues that are starving for it but are unable to make use of it. In the various forms of glycosuria, due to overproduction of sugar, no matter how great may be the glycosuria, the power to retain and dispose of administered dextrose is absolutely unlimited; merely an increase in dose is necessary to obtain increased utilization. The theory, therefore, that diabetes is solely an overproduction of sugar—a glass running over—falls to the ground.

CONSIDERATIONS IN THE MEDICAL TREATMENT OF GOITRE.

In the *New York Medical Journal* of October 21, 1916, ANDERS states that thyroid extract and iodine are contraindicated in the therapeutics of this form of goitre, if we except cases in which myxedematous changes occur as the sequel of secondary atrophy of the thyroid gland. The signs and symptoms of the concurrence of Graves's disease and myxedema are mental dulness, dryness of the skin, falling of the

hair, scleroderma, and, more important, supraclavicular swellings and a non-pitting edema. In this class of cases thyroid feeding from time to time is most useful in removing the features just enumerated.

One of the principal factors in the treatment of Graves's disease consists in the removal of recognizable causes. Certain writers describe a "secondary" or symptomatic variety, superinduced by special sources of irritation. It is undeniably true that the removal of these foci may, in rare instances, result in decided benefit, but Anders knows of no cures that have been effected in this manner. Putnam, however, correctly observes that "when the nervous system has been under the tax of bearing several loads at once, the removal of any one of them may suffice to communicate a new 'set' to the nerve functions or to provide the amount of relief needed to make recovery possible." It follows that an attempt should be made to remove intensifying sources of peripheral irritation whenever found to exist, with the reasonable hope of rendering medical and hygienic measures effective.

Among other prominent causative factors are emotional excitement, shocks, tuberculosis, rheumatism, syphilis, and intoxication from the intestinal canal.

When Graves's disease supervenes as a sequel of acute rheumatism, the use of sodium salicylate often yields excellent results. The writer has seen at least one striking and apparently complete cure from the exhibition of the salicylates. Their use should be interrupted for a few days at intervals of about one month. In cases in which syphilis is associated with Graves's disease, the employment of salvarsan is to be advised and encouraged. In a case reported by Ziegel, favorable results were obtained.

In four fully developed cases recorded by Epstein, as the result of large rectal injections of oil, with the purpose of removing all impacted fecal masses, an absolute cure was established. He holds that coprostasis with absorption of intestinal toxins is a very common symptom of the disease, and

even in cases in which diarrhea is present there may be pronounced fecal impaction. W. H. Thomson likewise emphasizes the possible influence of autointoxication from the intestines as a causal factor, and excludes all meats from the dietary in order to prevent its development.

S. Solis-Cohen states "whether or not the disorder is originated by the absorption of toxic products from the intestine, it is certainly aggravated thereby." In Anders's belief a careful regulation of the diet, thorough evacuation of the intestine by means of colonic irrigation with either a hot saline solution, as advised by Cohen, or large oil injections as recommended by Epstein, once or twice weekly, to obviate toxic absorption, cannot be too strongly emphasized. He has found heavy mineral oil administered internally of much service in unloading the bowel during the intervals between the irrigations.

Intestinal antiseptics are of distinct value in selected cases of exophthalmic goitre, the most effective, in his experience, having been betanaphthol, salol, and guaiacol carbonate.

Cases in which a clinical factor, other than shock, physical or emotional, is operative do not lend themselves to satisfactory medical treatment. In Anders's belief this view is tenable in no limited sense, judged by an extensive experience. True it is that many of the distressing and alarming symptoms can be relieved by various vaunted remedies, and in exceptional cases a cure may follow; but rarely indeed are the results so favorable as those achieved by timely surgical intervention. Clearly, since the knife offers so much more than our therapeutic armamentarium in these cases, it is the plain duty of the internist and general practitioner to request surgical aid without too much delay. If operation is refused by the patient—a not infrequent occurrence—or a contraindication exists (rarely), then medical treatment should be undertaken.

At the outset it is to be recollected that certain hygienic measures are vastly more important to the patient than any known

drugs or organotherapy. These patients are often greatly injured by being advised to travel or to take exercise. What they need in view of the presence of the circulatory disturbances, increased metabolism, and myasthenia, is rest of both body and mind. At the beginning of a course of treatment, massage and passive exercise should be substituted for muscular activity. Later, with improvement in the patient's strength, gradually increased exercise, carefully prescribed, may be advised, but should not be carried to the point of fatigue.

Hydrotherapy has been found to be useful. In general, however, a daily tepid bath to insure cleanliness is sufficient. Baths that tend to induce exhaustion are contraindicated. The environment should be cheerful, but free from mental excitement on the one hand, and all depressing influences on the other hand. The value of fresh air, judiciously taken, is undoubted. In addition to the usual methods of taking the air, the patient should be encouraged to recline out-of-doors, well protected against cold, sudden changes of temperature, and strong winds. The foregoing measures—rest, followed by suitable exercise, fresh air, a proper environment, and bathing—are more useful than drugs in controlling tachycardia, neurasthenia, and insomnia.

It is sometimes necessary, however, to supplement them by other means. For example, the tachycardia and palpitation may require the use of an ice-bag over the precordia, and a weak, rapid heart the administration of cardiac stimulants. As regards digitalis, it may be said that it often fails to control the tachycardia of this disease, and when employed it should be discontinued when found to be without favorable effect. Strychnine in small doses is effectual in combating cardiac weakness.

Of the numerous available remedies which have been advocated, two are worthy of elaborate mention. These are quinine hydrobromide and antithyroidin Möbius, the latter being prepared from the serum of thyroidectomized sheep and preserved by the addition of 0.5-per-cent carbolic acid. This product is available in bottles contain-

ing two and a half drachms (10 Cc.) and may be administered in doses ranging from ten to sixty minims, two or three times daily. It has no cumulative action. [In this country this remedial agent is called thyroidectin.—Ed.]

It is customary to continue the use of antithyroidin until the contents of one bottle are taken, and then to omit it for a few days, when it is to be resumed. Unfortunately, we are still ignorant, as Dock has pointed out, of the amount of this remedy requisite for the best results. Elsner and Wiseman state that antithyroidin confers benefit "by relieving the annoying and alarming symptoms of exophthalmic goitre in typical and atypical cases." In their experience the greatest improvement is found in the relief of the tachycardia, precordial distress, and tremor. This improvement was hastened by rest in bed and close attention to diet, and in serious cases it was necessary to continue the treatment during many months.

Personal experience confirms that of Elsner and Wiseman just cited. Antithyroidin causes the enlarged thyroid to lessen in size, but not beyond the normal dimensions. The relief afforded to the distressing nervous phenomena of the disease by antithyroidin, and its apparent harmlessness, combine to stamp this as a sovereign remedy in exophthalmic goitre. As in the case of the use of thyroid extract in myxedema, so it is found wise to administer antithyroidin after the active symptoms have subsided, during periods varying from four to eight weeks, at intervals of two to three months.

The second remedy worthy of careful consideration in connection with the therapy of Graves's disease is the neutral hydrobromide of quinine, first proposed by Forchheimer. Anders's custom has been to prescribe it in five-grain capsules three times a day after food, later increased to four doses of the same strength, daily, if well borne. The remedy is to be continued until the subjective symptoms, the tachycardia, and tremor have disappeared, after which it is to be diminished until a single

dose is taken daily. Should active symptoms arise during this tentative withdrawal of the drug, it must be resumed in full doses at once. The hydrobromide of quinine antagonizes hyperthyroidism, probably owing to its vasoconstricting effect, but it does so in a slow and gradual manner, hence patients should be told that they must be prepared to use it continuously for a period of months.

SOME RECENT ADVANCES IN CARDIOLOGY.

In the *Indian Medical Gazette* for November, 1916, WILLMORE points out as regards the treatment of heart disorders that the question whether digitalis should be given or not is of great importance.

Let us try and answer it in the light of recent research. It should hardly be necessary to reiterate the maxim: Never give digitalis unless there are signs of heart failure. To give digitalis to any patient who comes to us with an aortic or mitral murmur and who does not show signs of heart failure is to commit a therapeutic crime.

The difficulty is this—we have all experienced it: In one case we give digitalis with immediate and great benefit; to another, apparently similar, and there is no appreciable result. What is the reason? We say the drug was old and had lost its strength.

No! digitalis is a very stable drug. The secret is this: digitalis is of marvelous value in cases of auricular fibrillation and is of practically no value in any other condition. How does digitalis act in auricular fibrillation? It is a cardiac poison and it acts especially on the auriculoventricular bundle—it depresses conduction.

In auricular fibrillation we have all sorts of hurried, haphazard impulses passing down to the ventricle, which, in responding to them, is worried almost out of existence.

Depression of conduction makes it more difficult for these impulses to pass. The ventricle beats more steadily, slower; it carries on the circulation more efficiently. Heart failure is averted or removed. The

first essential therefore is a correct diagnosis.

How should digitalis be given? It must be remembered that when auricular fibrillation sets in it is nearly always permanent. Digitalis must therefore be given permanently. It should be given on the same principles as mercury is given in syphilis.

The digitalis must be pushed until the toleration point is reached. Just as in giving mercury the aim is to just touch the gums and then to lessen the dose, so in auricular fibrillation digitalis should be pushed until symptoms of poisoning appear. The symptoms of digitalis poisoning are nausea, vomiting, undue slowing of the pulse; and above all a coupling of the heartbeats—a bigeminy of the pulse. This last is a danger-signal which should not be reached. [We think that this is carrying the effects of the drug too far.—ED.]

The proper amount to give is that smallest dose which will steady the ventricle and which does not produce symptoms. It may take some weeks or months to find the optimum dose in any special case. Having been found, the patient should ordinarily take it for the rest of his life.

In conclusion two fundamental facts in connection with heart disease may be emphasized. In any case of cardiac disease the factor of prime importance is not the valvular lesion, it is the lesion of the muscle. If the cardiac muscle has escaped the effects of the injection or degeneration, as the case may be, the degree of valvular inefficiency is of little moment—the reserve power of the heart is almost incalculable. If the muscle is damaged a very slight degree of valvular mischief will suffice to produce heart failure. The second is the very great importance of breathlessness as a symptom in heart disease. In any particular case the degree of breathlessness may be taken as an index of the amount of heart failure—increasing breathlessness means increasing heart failure, and *vice versa*. And this does not apply to advanced cases of heart disease—the symptom mild in degree is the first to be looked for. If any individual becomes breathless in per-

forming acts he was formerly able to do with impunity, it is certain that the reserve power of his heart is diminished. [Provided pleural effusion is excluded.—Ed.] The symptom of breathlessness, therefore, should always be actively inquired into in every case of heart disease.

THE PROPHYLAXIS AND TREATMENT OF TETANUS.

MCGLANNAN in the *Military Surgeon* for January, 1917, in discussing this subject states that without attempting to reconcile the differences of opinion we may consider some of the advantages of iodine in the treatment of an infected wound.

1. It is practically non-toxic and therefore may be used freely.
2. It is not a caustic and does not sear the surface of the wound.
3. It will prevent the growth of ordinary pyogenic organisms.
4. It produces a marked and long sustained local hyperemia. This last is probably its greatest value.

The treatment of the wound, however, is not so important as is the prophylactic injection of antitoxin. If one or the other must be postponed, delay in the wound treatment is the lesser evil. This point is of great importance in military surgery. Wound treatment beyond the simplest first aid is rarely possible for many hours or even days after the occurrence of the injury. The injection is a simple procedure, and with a sufficient supply of antitoxin available could be carried out at the advanced dressing station and at the station for the slightly wounded.

Aschoff and Robertson recommend soaking absorbent cotton in antitoxin and drying it. This impregnated cotton may be applied to large wounds, and when it becomes moistened by the secretion, the antitoxin is liberated into the tissues. The possibility of utilizing this device is called to the attention of the recently organized First-Aid Conference.

On account of the frequent persistence of the tetanus bacillus in the tissues, the

protective action of the serum is limited to a period of ten or twelve days. If the wound has not entirely healed in this length of time, the injection should be repeated.

For the same reason it is necessary to administer a prophylactic dose before operating on sinuses or the wounds of those patients who have been exposed to infection.

The treatment of tetanus aims to provide for six conditions:

1. The neutralization of the toxin in the cerebrospinal fluid and in the blood.
2. Limiting or preventing the development of toxin at the focus of infection.
3. Interruption of the flow of toxin from the wound to the central nervous system.
4. Preservation of the nutrition of the patient.
5. Prevention of convulsions by protecting the patient from external stimuli.
6. Control of convulsions by abolition or obtunding of reflexes.

The first condition is met by the injection of antitoxin into the spinal canal and intravenously. Ashhurst and John outline a method of treatment, which has been modified by the work of Park and Nicoll.

Ten to fifteen thousand units of antitoxin are given intravenously, and 5000 units into the spinal canal. The spinal injection is given through the needle which has made a preliminary lumbar puncture. Should the spinal fluid be under increased pressure, a rare occurrence, a quantity equal to or greater than the volume of the antitoxin should be removed before making the injection. When the symptoms are marked, ether anesthesia may be required for making the puncture.

There is a difference of opinion regarding the management of the wound after the disease has developed. On the one hand, excision is advised for the purpose of removing the focus; on the other, it is condemned on the ground that such an operation only opens up new avenues for dissemination of toxin and bacteria.

The best method seems to be non-interference unless the wound clearly requires opening for drainage and disinfection. Oc-

casionaly it may be well to make injections of antitoxin into the tissues around the wound. Hydrogen peroxide, oxygen spray, etc., have no specific value in treating the wound.

For the third condition intraneural injections of antitoxin are efficacious. Such procedures as section of all the nerves from a limb, bringing the peripheral ends out of the wound for drainage, are unnecessary and unduly radical. The same seems true of the introduction of drainage tubes into the nerve.

It is better judgment to refrain from all avoidable traumatism and to rely on the antitoxin introduced into the cerebrospinal fluid and the blood, for combating the toxin.

The nutrition of the patient is of extreme importance. As long as he can swallow without difficulty, this is a simple matter. When dysphagia is present, and when the spasm of the jaw muscles keeps the mouth tightly closed, the problem becomes difficult. Nutrient enemas help for a short time, but every effort must be directed toward the relaxation of the spasm.

Morphia hypodermically is most useful in early cases, in which spasm of respiration and deglutition are often the only symptoms. Chloral hydrate, in doses sufficiently great to produce a distinct stupor, is valuable, but the large doses necessary, 20 to 25 grammes (!) daily, are not without danger.

Magnesium sulphate intraspinously is valuable, but not free from danger on account of paralysis of respiration. Subcutaneous injections of this drug are easier to give but are also somewhat dangerous. A 20- or 30-per-cent solution is used, and beginning with 5 Cc. the dose is gradually increased until diminished reflex activity is produced. A 5-per-cent solution of calcium chloride, or some 1/60 grain eserine tablets, should be available as an antidote.

After the injection, the spasms usually relax in about an hour and the effect of the drug lasts about six or eight hours. The injections are repeated as soon as symptoms return. Tightness of the chest and diffi-

culty in swallowing are usually the earliest signs of returning convulsions. Magnesium glycerophosphate has been advised, in place of the sulphate, in the hope of overcoming some of the bad effects of the latter salt.

All manner of desperate means have been advised for control of the spasm of respiration. Section of both phrenic nerves was successfully done by John for the relief of this spasm. Intratracheal insufflation should be kept in mind as a means for supplying air without respiratory movement.

Bacelli's phenol injections have received few reports in the war literature. The method has been used by several civilian observers in the last five years, but the results of this treatment are not as good as those of the serum method.

The results of intraspinous and intravenous administration of antitoxin far surpass those of any other form of treatment, and whenever antitoxin in sufficient quantity is available, this should be the method of choice for treating tetanus. With a scarcity of antitoxin, the intraspinous dose should be given rather than the intravenous.

Magnesium sulphate injections are valuable in military surgery because this agent is cheap and is usually available. The prolonged abolition of reflexes may permit the comfortable and safe transportation of the injured man to a base hospital. Combined with a dose of opium, this seems the best preparation we can give a tetanus patient for exposure to external stimuli, when the exposure becomes necessary. The symptoms of tetanus are aggravated by rapid travel; therefore the hospital train should not go faster than 20 miles an hour.

As is true of all infections, the efficacy of the treatment of tetanus varies directly with the period of the disease at which it is instituted. Early diagnosis and prompt treatment give the best hope for success.

The early symptoms of tetanus are not marked but are quite distinct.

Pain and stiffness in the muscles of the region of the wound may be mistaken for a simple myalgia, but this is easily differentiated by exaggeration of the local re-

flexes, which exaggeration becomes progressive. Twitching and stiffness of the muscles, when these are tapped, is an evidence of increased excitability.

Pain about the mouth, fatigue on chewing, and slight difficulty in swallowing, without any cause for this condition evident in the throat, are early and very certain signs, in a suspicious case.

Cramps in the chest muscles, generally described as a stitch in the side, and a sense of tightness in the chest, are other early symptoms.

Profuse sweating and a rapid pulse precede the onset of distinct lockjaw.

Starting at noises, at lights or in draughts, is evidence of undue reflex sensitiveness, and if occurring in the wounded, should give rise to a strong suspicion of tetanus.

CHLOROFORM IN OBSTETRICS.

FULLERTON in the *Cleveland Medical Journal* for November, 1916, says that chloroform is unquestionably a more powerful and toxic drug than ether, but so is scopolamine more powerful than codeine and must be administered with greater care and precision. The same applies to chloroform. The margin of safety is much narrower and the administration demands more skill and closer supervision. Since the danger of toxic effects increases with the prolongation of administration, chloroform anesthesia is not desirable for prolonged anesthesia such as may be necessitated by all operative deliveries excepting the simplest of low forceps.

So much for the several objections to the use of chloroform anesthesia during labor. Let us next consider its advantages. Such authorities as Engle, Veit, Müller, Carstens, Marcy, Williams, Cragin, Slemmons, and many others indorse the use of chloroform in normal cases, and it is the routine obstetric anesthetic in the Sloan Hospital for Women, New York, and the Johns Hopkins Hospital, Baltimore, as well as in other institutions too numerous to mention. In the first place, chloroform is less bulky to carry and much more agreeable for the

patient to take, especially to those who have formerly been nauseated by ether. When properly administered during the latter part of the second stage, and particularly when the head is emerging from the vulva, the patient can be freed from all pain quickly and completely with a minimum amount of anesthetic. The patient is instructed to notify the attendant when she feels a contraction starting; three or four drops of chloroform are then let fall on an Esmarch mask covered with not over six thicknesses of gauze, and the patient instructed to take several deep breaths, after which the mask may be removed as anesthesia is sufficient to abolish pain, yet the patient voluntarily or on being urged will make expulsive efforts. As the head descends and the vulva dilates the anesthesia is gradually deepened, so that when the head passes over the perineum the patient is completely anesthetized. As soon as the head is born the administration is stopped and the patient will, when no excess of anesthesia has been administered, regain consciousness in three or four minutes. The amount of chloroform for such a procedure rarely exceeds one to one and a half ounces, much of which has been lost off the open mask and not inhaled. The rapid recovery of consciousness and almost invariable absence of nausea and vomiting are agreeable and convenient features. Although recovery of consciousness is rapid, there is usually sufficient time, if one is prepared, to place any necessary perineal sutures, which may be tied immediately, or this act postponed until after the completion of the third stage.

If the anesthetic must be administered by a nurse or member of the household, closer supervision is necessary, but anesthesia is more quickly established and usually without the stage of excitement so common with ether, during which asepsis is so easily broken. For easing the pains of the latter part of the second stage of labor, and for complete anesthesia as the head is emerging from the vulva, chloroform is most satisfactory. So little anesthetic is necessary and anesthesia so quickly recovered from

that no important retardation of labor is observed, whereas if ether be used and sufficient given to produce an equal freedom from pain, the uterine contractions are delayed and decreased in intensity and the necessity for operative interference markedly increased.

Now to summarize the comparison of these two anesthetics. Chloroform requires greater attention and care and is more readily administered by an untrained attendant. The greater rapidity of action of chloroform and its more hasty elimination render it preferable to ether for eliminating most of the pain of the late second stage and actual delivery. Chloroform properly administered delays labor to a less extent than ether, and by making the patient more comfortable and thereby enabling her to use her accessory expulsive forces actually decreases the length of labor. Chloroform should never be given in the so-called toxemias of pregnancy, nor for prolonged anesthesia such as is necessitated by any but the simple operative procedures. Postpartum bleeding is no more profuse after chloroform than after ether, and if at all, is but very slightly more profuse than after delivery without anesthesia.

These factors make chloroform preferable to ether in normal spontaneous labors, especially in multipara with short second stages. Chloroform should not be given before the second stage is well advanced, and should then be administered in amounts only sufficient to abolish most of the pain. The length of administration will rarely and should not exceed thirty to fifty minutes, and the amount should average not over one ounce. Chloroform should always be administered through an Esmarch or other open mask and never in concentrated form.

In closing it is perhaps opportune to say that when available, and in trained hands, nitrous-oxide-oxygen is the anesthetic *par excellence* for anesthesia during not only the second stage but the latter part of the first stage as well, and then when used and somewhat more relaxation is required when the head is emerging from the vulva than

is usually obtained with nitrous-oxide-oxygen, a few drops of chloroform through an open mask will produce the required relaxation in minimal time, with least discomfort to the patient and most satisfaction to the attendant.

"NEEDLING" PAINFUL SPOTS, AS PRACTICED BY THE CHINESE.

In the *China Medical Journal* for November, 1916, CANTLIE writes that from time immemorial the Chinese have practiced "needling" the body for the relief of pain, of swellings, of stiffness, and in the treatment of many ailments. The practice has become with them an art—an exact science, in fact, if the term science can be applied to such a proceeding.

The model of the human body in brass, with its many indicated puncture points, is a well-known feature of wonder to the northern Chinese, and the pictures of the model are met with throughout the Empire.

To each one of the hundreds of puncture points indicated in the model a curative effect is attached, and the modern student of surface anatomy may well stand aghast when asked to interpret the several structures any particular puncture might traverse when pushed deeply; and the clinician will be puzzled to explain the possible effect likely to be produced thereby. We may and do say: "There is something in it;" but we seldom if ever venture to practice it, except occasionally in an experimental and tentative fashion, as, for instance, by placing an electric needle in the sciatic nerve.

Is the idea one of counter-irritation merely, or is it practiced with the idea of puncturing circumscribed effusions which, owing to their presence, distend the tissues and thereby engender localized pains? It is scarcely possible to suggest any other reason for the employment of "needling," but either the one or the other is sufficient to justify its use if it can be proved that good results obtain.

The Chinese have other and less severe methods of counter-irritation. Nothing is

more common than to see the skin of persons in China suffering from fever and many other ailments covered with circumscribed contusions produced by "nipping" the skin between coins (cash). This procedure is more easy of accomplishment and less technical than needling, and as a counter-irritation more potent. It would appear, therefore, that the puncturing of fasciæ is the reason for the practice, and the only possible way in which "needling" can claim to be a rational treatment. It may be asked, Is the puncturing of fasciæ to relieve tension so frequently required as a means of treatment? The fact is, we know little of such a pathological condition; for instance, what do we know of the real pathological state in lumbago? Our treatment is empirical because our knowledge of the ailment is limited—it might be said non-existent. Is it an effusion into the mass of lumbar muscles? If so, then is the mystery explainable and the puncture of the thick fascia covering the muscles justified as a rational therapeutic agent. This is evidently the reason for the Chinese practice of "needling," which undoubtedly relieves pain and shortens the duration of the ailment. Relieving tension when an organ is inflamed is a sound and long-practiced method of treatment in scientific medicine. It is chiefly confined, however, to a few organs only; at one time free incisions for orchitis were in vogue, but beyond that and subcutaneous inflammation the procedure is seldom carried. Were it extended to inflammation of the liver, the lungs, glands, and other organs, good might and, theoretically, should ensue.

Any one acquainted with puncturing the liver by a needle in search of liver pus knows well that after, say, half a dozen to a dozen unsuccessful punctures the temperature often falls, the enlarged liver diminishes, and a rapid cure of the hepatitis occurs. By this procedure the severe tension of the liver capsule is relieved, blood escapes into the cavity of the peritoneum from the punctured points, and the condition is ameliorated or the ailment cured. Were lobar pneumonia treated similarly,

equally good results might be anticipated, but the procedure is not included amongst the methods of treatment to-day; yet during search for liver pus we often traverse the lower part of the right lung, which in all cases of hepatitis is deeply congested, with great benefit to the lung itself. That this frequently occurs has been brought home to the writer, as the patient coughs up some blood as a result of the lung puncture, a result which acts beneficially in every instance this has occurred.

So impressed has the writer become that he has adopted "needling" for many ailments, amongst which are the following:

1. So-called rheumatic pains in the gluteal region and in the neighborhood of the hip-joint when pain is not relieved in any other way.

2. For pains passing down the back of the thigh, frequently associated with neuralgic pains over or in the sciatic nerve, and forming part and parcel of a general tenderness in hip, hip-joint, and thigh.

3. To dispel swelling and pain around the shoulder-joint in which a "rheumatic" type of pains and conditions following an injury to the shoulder has set in.

4. For "lumbago" due to (a) injury, or to (b) "rheumatism" ascribed to chill, when either is of long standing and other remedies fail.

5. To dispel the stiffness and swelling so apt to follow a sprained ankle.

6. When after a fracture of the leg or other parts the tissues become so bound together that the muscles are hampered in their action and ordinary massage fails to improve matters.

7. Over the sacrum and adjacent area of the pelvis, in which pains in woman, ascribable to pelvic trouble, are so frequently complained of.

The most frequent necessity for treatment arises, however, in the region of the hip, where one has to deal with those indefinite pains in both men and women usually styled sciatica.

Dr. Wm. Bruce, of Strathpeffer, taught the writer that much of the sciatica diagnosis so frequently made is not due, at any

rate primarily, to the sciatic nerve at all, but to changes in and around the hip-joint, and that the chief tender spot in connection with these changes is in the post-gluteal region, just above or behind the sciatic notch.

The writer has followed Dr. Bruce's teaching, and is so convinced of the truth of his statements that, not content with mere massage, he has "needled" the surroundings of the hip-joint above and behind, and punctured at times even the capsule of the joint itself.

In another type of hip ailment the writer has used "needling" with benefit. To give an example. A man playing tennis "did something" to his hip which "lamed" him for a time. Rest, fomentations, electricity, massage, etc., were applied, and still the trouble remained for many months. In the course of some two years he never was rid of a "crippling" pain, especially after he had sat still for some time. Thinking to hasten matters, he tried exercise again, and when playing tennis was again seized by "sciatic" pains, which necessitated resting for a time. The trouble continued and rather increased in severity. On examining him when he came home on leave from abroad a definitely tender area was found in the gluteal region, above and behind the great trochanter, leading up to the crest of the ilium, just about the spot where the last dorsal nerve crosses the ilium. Defying all known treatment, the writer, using an anesthetic, on two occasions punctured the area of the hip deeply, most of the punctures reaching down to the bone. The punctures were made down the thigh along the tract of the sciatic nerve, down to the back of the knee. The needles were also made to puncture the capsule of the hip-joint at three places. The method of manipulation consisted of holding a harelip pin in either hand and rapidly thrusting each deeply into the tissues, over a hundred punctures being made in the space of two or three minutes.

The benefit of this treatment was apparent, and its repetition still further continued to do good.

This short account of "needling" may serve to bring up for discussion a practice which has tradition—that is, experience—for its justification; and there can be no doubt that as a rational treatment it has much to recommend it.

THE ACTION OF VERATRONE IN THE TREATMENT OF ECLAMPSIA.

In the *Edinburgh Medical Journal* for December, 1916, HAULTAIN concludes from its use that it may be stated that we have in veratrone a drug of the utmost value in the treatment of eclampsia, as shown by its success in the treatment of 38 consecutive cases. After the initial dose of 1 Cc. subsequent doses should be regulated by the blood-pressure of the patient, as by so doing it can be given with safety and to the greatest advantage.

THE USE OF PITUITARY EXTRACT FOR THE INDUCTION OF LABOR.

In the *Interstate Medical Journal* for December, 1916, ADAIR reaches these conclusions:

1. The use of pituitary extract for inducing labor, particularly in premature, mature and post-mature cases, should not be abandoned.

2. It appears to be of value in bringing on labor in premature cases in some instances, and is worth a trial where it is not necessary to end the pregnancy rapidly.

3. In cases with ruptured membranes it is of value in initiating uterine contractions.

4. In cases of placenta previa marginalis or lateralis, where the membranes rupture or are ruptured artificially, it is of value for starting uterine contractions and may save the necessity of intrauterine manipulations.

5. It is a help in cases in which mechanical means are used to induce labor and may limit the amount of manipulation necessary.

6. In cases at term it is of value in starting labor.

7. It should be used in cases going over-time before any other method of inducing labor is resorted to, except in those cases

in which it is contraindicated or it is necessary to terminate the pregnancy more rapidly. [To which advice we would add, never use it in a pregnant woman unless the os is well dilated.—Ed.]

THE DIAGNOSIS AND CLINICAL CHARACTERISTICS OF GOUT.

PRATT in the *Boston Medical and Surgical Journal* of December 28, 1916, reminds us that the prompt relief from the pain produced by colchicum in gout is so striking that many have asserted that this drug is a specific in gout. It is certainly an aid in diagnosis, as colchicum does not have such a marked effect in relieving the pain in acute rheumatism or in other conditions which may be confounded with gout. Salicylates rarely have any marked effect in controlling the pain of acute gout.

The relief from the severe pain of gout by atophan is even more striking than that produced by colchicum. Its value in diagnosis is probably less, as it often is of considerable aid in checking the pains of non-gouty arthritis.

THE CONTROL OF STRYCHNINE CONVULSIONS BY INTRASPINAL INJECTIONS OF MAGNESIUM SULPHATE.

CUTLER and ALTON in the *Journal of Experimental Medicine* of January 1, 1917, state that they feel that the results obtained in a human case and in their animal experiments justify the supposition that magnesium sulphate may be of use in controlling cases of poisoning by strychnine. It is a method easily available, not only in large hospitals but in private practice, and requires no elaborate technique. The amount of magnesium sulphate to be used should follow the advice of Meltzer in tetanus cases: intraspinally 1 Cc. of a 25-per-cent solution to each 20 pounds of body weight in adults, and one-half the dose in young children. Should this not control the convulsions a small amount of ether may be used. In order to hasten the excretion of strychnine, 200 to 300 Cc. of salt solution

should be given intravenously. In the event of the return of the convulsions, the intraspinal dose may be repeated, always taking precautions to keep the head elevated. Meltzer's apparatus for the intrapharyngeal insufflation and a 2.5 per cent of calcium chloride should always be on hand in case of respiratory failure following an overdose of the magnesium salts (Meltzer).

TREATMENT OF SEPTIC WOUNDS WITH GLYCERIN AND ICHTHYOL.

In the *Journal of the Royal Army Medical Corps* for December, 1916, ALDERSON states that at the divisional rest station in France, where practically all the operations were of the type carried out in the surgical out-patient department of a civil hospital, namely, the opening of superficial abscesses, it was decided, after reading Major Duggan's articles in the *Journal of the Royal Army Medical Corps*, to try dressing these cases with glycerin and ichthyol instead of boracic fomentations. At first a 20-per-cent but later a 10-per-cent solution, spread on ordinary white lint, was used, and later, for purposes of economy, commercial glycerin was substituted for pure glycerin. Fifty-nine cases were thus treated after operating under an anesthetic, besides many others of which no record was kept, and in which no anesthetic was necessary. They included carbuncles, whitlows of all types, and three cases of cellulitis, two of the upper and one of the lower limb. In favor of this treatment are the following points:

1. Saving of labor and material—one application daily being substituted for three boracic fomentations.
2. Efficiency as a dressing. In several of the cases previously treated with boracic fomentations, the discharge was never more in twenty-four hours on the one glycerin and ichthyol dressing than on any one of the fomentations, though these had been changed twice and thrice daily.
3. The dressing does not adhere to the wound.
4. Men voluntarily told the nursing or-

derlies that they found the ichthyol dressing more soothing.

This treatment is therefore recommended to medical officers, civil and military, for use in dressing superficial septic sores and wounds, as being (a) equally efficacious, and (b) more economical, as regards time and material, than the boracic fomentations.

PERTUSSIS.

ABT states in the *Archives of Pediatrics* for December, 1916, that the value of vaccine in the treatment of whooping-cough is still under consideration. The reports are conflicting. Some are sanguine. Alfred Hess (*Journal of American Medical Association*, Sept. 19, 1914) found no curative results from the use of vaccine during the disease, notwithstanding the fact that he used an autogenous strain in one series of cases. According to his statistics the prophylactic treatment cannot be regarded in any sense specific. Of 244 cases that were vaccinated 20 came down with the disease.

Matthias Nichol and Paul Luttinger treated whooping-cough with stock vaccine, and came to the conclusion that the average duration of the treated cases was twenty-five days, and that cases which received both commercial and stock vaccines, eight in number, lasted forty days.

Paul Luttinger, in his latest communication, says that when the proper vaccines are used there has been a shortening of the paroxysmal stage, and a reduction in the severity and number of the paroxysms.

Out of 2103 patients with pertussis, 75 per cent of whom were treated with vaccines, 15 deaths occurred; 10 of this number were treated with medicine and one with injection of the vaccine. The other four were treated with vaccines exclusively, two of them being commercial vaccines and two others the stock vaccine prepared by Luttinger himself. No death occurred in any patient who presented himself before the third week and received the vaccine treatment regularly.

As a prophylactic, Luttinger thinks that the vaccine is efficient if used sufficiently

early, and that it is capable of aborting the disease if no time be lost in its use.

The possibility of immunizing by vaccination is still an open question for pertussis. Those who received prophylactic injections, as well as those who did not, remained free from the disease in about equal numbers.

Fresh-air treatment, good hygiene, and efficient nursing are the most important factors in the treatment of the disease. So far as drug therapy is concerned, there undoubtedly are medicines which relieve the paroxysms and insure rest and quiet for the patient. These are found among the antispasmodic and sedative drugs.

There is scarcely a disease where so many drugs have been employed and later on abandoned for some more popular remedy. The list of drugs is a very long one. It is to be hoped that a specific remedy will be secured which will prevent and cure the disease if used sufficiently early. One will suffice.

[The practical difficulty in private practice is the objection of mother and child to repeated needlings.—ED.]

SUBLINGUAL MEDICATION.

In the *Practitioner* for December, 1916, MURTZ tells us that for the last twenty years he has extensively employed the sublingual method of medication, and he is fully in accord with what Dr. W. Paulson said in the *Practitioner* for October, 1916, concerning this method. He adds that the selection of the sublingual space is the one *par excellence* for the rapid transmission by absorption of crushed hypodermic tablets into the circulation, and patients take very readily to this mode of treatment. This is an important matter in private practice, where very fastidious patients are constantly to be reckoned with. No matter how carefully we use the hypodermic syringe, and apart from the risk of infecting the patient, the objections to its use are numerous. Practice has taught that the piston of the syringe will refuse to act unexpectedly, that the needle is blocked, the glass cracked, or the mountings have come

off. Murtz has several hypodermic syringes of the latest patterns, and keeps them in an excellent condition, but he very seldom uses them except by the express wish of a patient who has had injections before. A syringe will not lie idle very long before it becomes faulty, and the constant attention one has to pay to the fine wires within the needle is a serious handicap to the physician. By the sublingual method, all that he has just mentioned is avoided, the exhibition of the remedy is a direct one, and no mechanism of any kind is required.

ON THE CAUSATION AND TREATMENT OF "RHEUMATIC" CONDITIONS.

Writing in the *Prescriber* for December, 1916, WALLER expresses the belief that the treatment of rheumatoid arthritis is still eminently unsatisfactory. The same remark applies equally to a host of allied conditions designated as fibrositis, lumbago, sciatica, muscular rheumatism, neuritis, and so forth, all of which may loosely be grouped as "rheumatic." Salicylates, though undoubtedly of extreme value, seem to be more potent in the disease which we term rheumatic fever, or acute rheumatism, but even in this complaint the number of crippled hearts emphasizes the need for some advance in treatment. Correct treatment must depend on a correct estimate of the pathology of the disease under consideration. Acute rheumatism, which we will consider as a synonym for rheumatic fever, very commonly starts with tonsillitis, though not always. Waller has seen a case in which the infection started apparently in the nose. There are many who also think that the other group of complaints, which may be loosely termed rheumatic, are also due to germs. We have gonococcal and pneumococcal arthritis as definite examples, and also cases of septic arthritis, where the organism is a streptococcus or staphylococcus. But in rheumatoid arthritis the joints have hitherto proved sterile. Nevertheless, the analogy is so great that one cannot help feeling that here also some germ is at work.

But where? The fashion of late years has been to assume that oral sepsis is the cause. It is, of course, essential to eradicate oral sepsis in any case of rheumatoid arthritis, and the teeth should always be the first point for investigation. But in some cases of rheumatoid arthritis all the teeth were taken out many years ago, while the rheumatism began quite recently. Waller does not wish to underrate the importance of septic teeth (pyorrhea and chronic abscesses at apex of root fillings) as a cause of rheumatoid arthritis, but he cannot help feeling that the real seat of the trouble is in the intestinal canal.

Sir Arbuthnot Lane has practiced resection of the large intestine in some cases of rheumatoid arthritis, and his photographs of joints, before the operation and after, leave no room for doubt that benefit has followed. Perhaps it is better to part with tonsils, teeth, and large intestine than to have rheumatoid arthritis. But one may be pardoned for seeking simpler remedies. Waller's best successes so far have been obtained with vaccines, mixed streptococcal, staphylococcal, and bacillus coli. The addition of *B. coli* to the vaccine has appeared to be highly beneficial in some cases, but possibly it acts in a roundabout way. He is quite sure that there is a reflex relationship between the colon and the stomach. Clinically he has observed frequently that a mild colitis is an accompaniment, or the precursor, of hyperchlorhydria. Perhaps the colon, irritated by the particles of what it considers to be insufficiently digested food, sends messages to the stomach to do the work better, and the stomach tries to obey. Such a reflex would at least seem to be common sense.

This combination of mild colitis and hyperchlorhydria has, in some cases that Waller has seen, been commonly followed by rheumatoid arthritis, again of a mild type. A joint would become acutely painful to movement for a day, or perhaps be merely uncomfortable for a longer period, and then get well, though some grating could always be elicited. These considerations have urged upon him the desirability

of finding an intestinal antiseptic for use in "rheumatic" cases, and for this purpose he has been using mercuric chloride. He made considerable trial of this drug in hospital practice while salicylates were soaring in price, and it served him very well, though it still leaves much to be desired. In two or three cases it was wonderfully effective. One boy of about sixteen, suffering from subacute rheumatism, had been taking 10 grains of sodium salicylate thrice daily for six weeks or longer with very little improvement. His troubles promptly cleared up on changing the prescription to liq. hydrarg. perchlor., m. xx, t. i. d. Waller also had some cases of "neuritis" that were promptly relieved. He has not tried big doses, because he did not want to risk mercurialism in hospital out-patients that he might not see for two or three weeks. He tried a mixture of calcium chloride, hydrarg. bichlor., and cascara for chronic rheumatoid arthritis, and fairly good results were reported. Latterly he has given a mixture of sodium salicylate and liquor hydrarg. bichlor. as the two or not incompatible, and it seems to be an improvement on sodium salicylate alone. He might add that there was no reasonable ground for suspecting syphilis in the cases that improved on mercury. He merely gives these clinical observations for what they are worth. It would seem that they may profitably be followed up.

[The observation that this treatment is efficient may be correct. The belief the mercury bichloride acts in the stomach and intestine as a direct antiseptic must be an error.—Ed.]

THE INFLUENCE OF ACIDOSIS ON HYPERGLYCEMIA IN DIABETES MELLITUS.

In the *American Journal of the Medical Sciences* for January, 1917, EPSTEIN and FELSEN state that the observations made in their study of this subject point to the following conclusions:

1. The withdrawal of food from certain cases of diabetes provokes or aggravates the acidosis.

2. The acidosis causes an increase in the blood-sugar content, in one of two ways: (a) by augmenting the mobilization of sugar, and (b) by affecting the sugar-secreting function of the kidneys.

3. Liberal, but judicious, administration of carbohydrate may control the acidosis provoked by the withdrawal of carbohydrates or complete fasting, thus leading to a general amelioration of the diabetes.

4. A progressive rise in blood-sugar content, associated with a gradual fall in the alveolar carbon dioxide, is indicative of impending coma.

THE THERAPEUTIC USES OF BULGARIAN BACILLUS.

In the *Memphis Medical Monthly* for October, 1916, GRAY quotes Clark as asserting that the most impressive facts which stand out boldly as the result of this method of treatment in infantile diarrhea are:

1. The gain in weight, in spite of the number of stools.

2. The rapid change of color of stools.

3. The rapid subsidence of fever.

4. The absence of mucus and blood from the stools at the end of forty-eight hours.

5. The fact that the hygienic surroundings of the patients and the degree of intelligence of the mothers had no influence on the results.

6. A starvation diet, accompanied by purgation, is productive of loss of weight and strength, and serves to prolong the course of the disease.

7. In severe cases the best results are obtained by administering a large number of tablets during the first two or three days of the treatment, as many as 42 Bulgarian tablets in twenty-four hours having been given to very young babies without untoward effects.

8. The implantation method of treatment has progressed beyond the experimental stage, and the result of its use can no longer be questioned or disputed. This treatment has proved of practical, clinical, and scientific value, and its simplicity should appeal to every practitioner.

9. In order to secure the best results in using the implantation treatment, a pure culture of the true bacillus lactic acid *Bulgaricus* must be employed, otherwise disappointment will follow.

Gray's own results have been identical with those of Clark. In 87 cases of fermentative or putrefactive diarrheas of children, treated in the past two years, there has not been one failure.

He is unwilling, as yet, to omit the preliminary mild purgation with calomel, since he believes he gets quicker results, especially in cases with fever, with it. After that he orders two tablets in a little sweetened water with each feeding, and feels secure in the knowledge that the little patient will be improving within forty-eight hours.

His experience with this treatment in adults is more limited. Three cases of toxic angioneuroses, two manifested in the form of erythema multiforme, and one in a chronic urticaria, have been relieved.

One case of chronic intestinal indigestion, closely simulating recurrent appendicitis, is very much improved. Two other cases of intestinal indigestion, with embarrassing formation of gas and borborygmus, are seemingly cured.

One case of pellagra, in a male of sixty-seven, with a persistence of red tongue and slight diarrhea, after disappearance of other symptoms, is entirely relieved.

A case of pulmonary tuberculosis, complicated with chronic nephritis and ptosis of the abdominal viscera, is showing much improvement in digestion and evidence of less strain on the kidneys.

It will be useless to expect good results from this treatment unless a pure, viable culture of type "A" bacillus lactic acid *Bulgaricus* is secured and due care is taken to keep the organisms viable. From the time the cultures leave the laboratory until they are administered to the patient, they should be in a temperature of not exceeding 60° F., except for the very short time while in transit. This can be done by purchasing from a dispenser, who keeps them in a refrigerator, and by directing that they be

administered from the refrigerator at home. If this care is not taken disappointment will surely result.

COMPARATIVE VALUE OF THE METHODS OF TREATING TETANUS.

In writing on this topic in the *American Journal of the Medical Sciences* for December, 1916, GIBSON says that it is presumed that the wound treatment will be that suitable to the injury and particularly to the most efficient form of drainage and liberation of sloughs, removal of foreign bodies, etc., that may harbor tetanus germs or favor their development. He doubts if to-day we are justified in performing an amputation for the relief of tetanic manifestations, as in the intraspinal administration we have gone a step further in efficiency. Likewise, he will omit the question of nursing and the use of sedatives. One sedative, however, should be alluded to, as it has been thought to have curative qualities *per se*, namely, the chloretone treatment advocated by Hutchings.

Gibson is also inclined to make a trial of atropine as a method of controlling spasm, as this drug has lately impressed him greatly in the treatment of spasmodic contraction of the pylorus.

Antitoxin treatment should be begun immediately on suspicion of tetanus developing rather than waiting for the classical symptoms. If this principle is firmly established, he believes we shall have done much to lessen the dangers of the disease. Antitoxin should be given at once, first into the wound or region of the wound, say 1500 units, intraspinally, without an anesthetic, unless the treatment of the wound calls for the administration of a general anesthetic, 5000 to 20,000 units. In the course of the first twenty-four hours, in addition to the above, 10,000 to 20,000 units should be administered intravenously in divided doses, say two or three. Antitoxin intravenously from 5000 to 15,000 units should be given next day no matter whether the symptoms remit or increase. On the third day, if, notwithstanding the

treatment, the patient's symptoms continue very severe or appear worse, the intraspinal treatment should be repeated. The intraspinal, of course, gives temporary increase of symptoms and steep elevation of temperature, but this fact need not of itself cause alarm. If after this treatment the patient holds his own or improves the intraspinal need not be repeated, but the daily injection of antitoxin intravenously should be given until obvious remission or cure results.

The severity of the cases will, of course, vary, and the resulting treatment will depend on this factor. He calls attention to a case which received a total of 139,000 units, which included 29,000 units given intraspinally in six sessions, in this case, daily, although Gibson doubts if this frequency is often indicated.

His series of cases reported is small, and he is fully aware of the dangers of deducing results from such material. On the other hand, he is under the impression, although he finds it hard to put into words, that although many of these cases were of the severest type and very ill, he had, particularly in the intraspinal method, complete control of the situation. With this feeling of confidence, therefore, he would hesitate to offer any other method of treatment until there is better evidence of the superiority of other methods.

SALVARSAN IN THE TREATMENT OF THE DOUBLE INFECTIONS, TUBERCULOSIS AND SYPHILIS.

In the *American Journal of the Medical Sciences* for December, 1916, POTTER reaches these conclusions:

1. The prompt employment of salvarsan or neosalvarsan is indicated in latent, chronic, and moderately active tuberculosis: (a) as soon as the nature of an added infection is diagnosed with reasonable probability to be syphilis; (b) whenever the history, signs, or symptoms strongly suggest a previous luetic infection, particularly if such a patient is not improving upon the usually successful hygienic and climatic

treatment for tuberculosis; but (c) active tuberculosis, acute tuberculosis, and diffuse miliary tuberculosis are usually contraindications to the use of these new arsenic preparations, although in both the first two mentioned groups there will be found many luetic patients upon whom a small dose of salvarsan may well be tried and, unless followed by untoward effects, cautiously repeated in gradually increasing doses.

2. When tuberculosis infects or becomes active in a patient with secondary, tertiary, or even latent syphilis, the careful employment of one of these drugs is also indicated.

3. The more active the tuberculosis, the smaller should be the initial dose; the slower its increase, the less frequent the interval, and the greater care and watchfulness required.

4. Tuberculin-like focal reactions may follow their administration, should be carefully watched for, and, if present, the location, intensity and character will frequently guide in the selection of the next appropriate dose or interval.

FAILING CARDIAC COMPENSATION DURING PREGNANCY.

In the *Boston Medical and Surgical Journal* of December 14, 1916, LAWRENCE asks and answers the question, "Given a patient who has had slight failure of compensation which disappears under proper treatment, what shall be done during the remainder of pregnancy?" First, the decision must be made at this point as to whether the patient may be allowed to continue pregnant, or whether the uterus must be emptied. And if the latter course be decided upon, it should be carried out at once. The physician should be in possession of enough evidence at this time to make his decision sufficiently certain to act upon, for if he hesitates further, he is likely to encounter conditions which make waiting and interference alike extremely hazardous.

If the patient has had a previous break in compensation or numerous small periods of subefficiency of the circulation, or if with mitral stenosis the latter only have occurred

frequently, it is the writer's belief that pregnancy should be allowed to continue for one reason only—that the patient, in full knowledge of the risk she runs, refuses the chance to forego bearing a child. Under such conditions, sudden death or chronic invalidism are too often the result of allowing pregnancy to continue to justify the physician in advising it.

If the patient elects to run the risk, what can be done in the way of treatment? Education in sparing herself all the strain she possibly can will do much. Some writers believe that too much emphasis should not be laid on the patient's condition, arguing that in such cases optimism is a great asset. With the latter idea the writer thoroughly agrees, but optimism should be based upon the patient's ability and willingness to give herself every chance and not upon the hope that she may pull through somehow. "It is a condition that confronts us, not a theory."

Should such a patient be given digitalis more or less continually? The writer's experience with ambulatory heart cases convinces him she should. Although digitalis is said to be indicated only in broken cardiac compensation, there are in every out-patient medical clinic numerous patients whose compensation remains sufficient only so long as they take digitalis, and fails when they cease to do so. Its continued use does not provoke tolerance. There are on record at the Massachusetts General Hospital patients who have taken it practically continually for five years without harm or decreased effect. If in the latter months of pregnancy the right side of the heart is continuously dilated, and if the patient has superimposed on that condition a mitral lesion, digitalis logically should be of benefit. It is not necessary to give it daily, for, owing to its prolonged action, the patient may be kept under its influence by taking it, for example, five days a week during three weeks a month. Such a régime will often make the patient much more comfortable and will diminish rather than increase the work the heart does. Furthermore it tends to prevent the accumulation of

fluid in the abdomen and pelvic organs. The absence of demonstrable edema on the surface is not proof that it does not exist in the internal organs, to complicate operation and increase danger of infection if pregnancy be terminated, as it often is in such cases, by Cæsarian section.

The other alternative is that which would be chosen for the non-pregnant patient—rest in bed so long as compensation cannot be maintained without the aid of drugs. Pregnancy, and impending labor, however, introduce the certainty that this rest cannot be continued indefinitely, and may be suddenly terminated by the extraordinary demand of labor upon the heart. In preparing for this demand, it seems more logical and actually gives better results if the patient's general muscular tone, and particularly that of her cardiac muscle, be given the benefit of a moderate exercise, even though this régime requires the administration of some digitalis. Eliminating all exercise tends to produce muscular weakness and constipation, and is not the logical way to prepare the heart for the extreme effort of labor. That this is true practically as well as theoretically is shown by the results in such cases. Too often the heart, compensated for rest, is entirely unable to meet the demands of labor, even though that event be made as short and easy as possible. The writer believes, therefore, that it is wiser to treat the patient as an ambulatory case, guarding against decompensation by giving digitalis as described above, so long as the drug does not upset the stomach.

This latter condition cannot be too carefully guarded against. Abdominal or even gastric distention has more than once been sufficient to change the condition of the heart from good to fair, or from fair to poor compensation. The elimination of carbohydrates and the division of the necessary amount of food into six small meals often add greatly to the comfort of a patient with slight cardiac inefficiency.

If digitalis is given, as suggested, any emergency arising during the period of its omission can be met by intravenous medica-

tion—a method which should be used more often in cardiac emergencies.

In mitral lesions these emergencies are usually due to acute dilatation, mainly of the right side of the heart. Such a condition demands vigorous treatment, directed along two lines—first, the reduction of the load the right side is carrying; and second, stimulation of the heart muscle. To meet the first indication, venesection is by far the most satisfactory maneuver at our command. The writer has used it in twenty cases, has repeated it several times in several patients, and on the basis of this experience believes that it acts more promptly, more surely, and more thoroughly than any medication. The amount of blood removed can be accurately controlled, and the bleeding stopped instantly if necessary. In emergency it can be performed in less time than it takes to give a hypodermic injection.

In obstetrics the objection may be raised against it that the patient, if labor ensues promptly, will lose still more blood, and that it is therefore unwise to deprive her of any beforehand. Venesection, however, may make all the difference between life and death. The amount of blood it is necessary to withdraw materially to benefit the heart is usually not over ten or twelve ounces. And with transfusion reduced to its present simple technique an equal amount of blood may be quickly introduced into the circulation. Venesection should not be withheld in the presence of acute cardiac dilatation from the fear of subsequent loss of blood.

For the stimulation of the myocardium, digipuratum intravenously, or if the patient is free from digitalis, strophanthin intravenously, has given the best results in the writer's hands. The latter has caused no bad effects when given to patients not under the influence of digitalis.

In spite of the greatest care in deciding which patients can go through pregnancy handicapped by cardiac disease, and in regulating their lives with regard to that handicap, there will be unavoidable catastrophes. Pregnancy and imperfect cardiac

compensation are incompatibles, and their coexistence constitutes always a grave menace to the patient. One or the other must be eliminated; either good compensation must be maintained under ambulatory conditions, or pregnancy must be terminated. And if the patient's life is to be saved, the decision must be reached before the latter method of meeting the situation becomes too hazardous.

THE ETIOLOGY OF PELLAGRA: A CONSIDERATION OF VITAMINE DEFICIENCY.

WOOD in the *American Journal of the Medical Sciences* for December, 1916, points out that it is obvious that vitamine deficiency of the grain food may be replaced by an abundant protein diet of fresh lean meat, fresh milk, eggs, and various other expensive foods. It is also obvious that an infant may be protected from scurvy while on a faulty diet by giving such an antiscorbutic as orange juice. But is there justification for such a procedure? With the gradually increasing cost of foods of the vitamine-supplying type, the poor whites of the South are no nearer their salvation from this great scourge. Lombroso once said that it would be equally as effective to advise his patients to be rich as to advise the diet needed, and if the patient were rich he would not have to be advised about the diet, for his natural desires would protect him from the disease. If decortication of grain and faulty methods of cooking cause the disease, the remedy is not beyond the reach of the poorest pellagrin. And this is Wood's experience. It is, of course, granted that the high protein diet is most desirable, but the practical solution of the pellagra problem in the South calls for some other remedy. It can be easily shown that people live without meat, milk, eggs, and other expensive protein, and still do not suffer from pellagra. Wood's experience is that such people do not eat decorticated grains. He has also learned that the response from feeding pellagrins the decorticated portions of the grain is more prompt

than when the diet is meat and eggs. It is to be hoped that the vitamine preparation of A. Seidel, which is prepared from brewer's yeast, using Lloyd's reagent, will be an inexpensive source of making up the deficit in the diet of the pellagra class. He has had no opportunity to test it in the treatment of the disease.

It would appear that pellagra is readily prevented; that the prevention does not require any increased cost of living; that the use of whole grains that have not undergone destructive changes and the avoidance of alkaline rising agents would entirely eradicate the disease.

INTESTINAL AUTOINTOXICATION.

The *American Journal of the Medical Sciences* for December, 1916, contains the report of cases of this type by BROWN.

The striking features of one case were (1) the apparently definite connection between the acute intestinal disturbances and the "eye-aches" of the patient, ophthalmoscopically recognized as acute attacks of choroiditis; (2) the fact that with these attacks the stools were always alkaline, while bacteriologically there appeared as the predominant microbes three Gram-negative anaerobes which he was unable to definitely identify, notably a large diplococcus, these anaerobes usually being practically absent when the stool was acid, while the diplococcus was isolated in pure culture from the appendix at the time of an appendicostomy operation performed later; (3) the extreme difficulty in keeping the stool acid even with a meat-free carbohydrate-rich diet, and enormous doses of an acid-forming bacillus—the bacillus bulgaricus; (4) the considerable improvement brought about by a low protein diet, which was markedly increased by an appendicostomy with colonic irrigation through the new opening; (5) the ability to prophesy the choroidal attacks from the alkalinity of the stool and its large content in certain anaerobic bacteria.

When Brown speaks of toxic symptoms he is unquestionably treading on debatable ground, and yet certain of the symptoms

met with in these cases are explicable only on this basis. What is the cause of these toxic symptoms? Is it a toxin normally present or in excess? Has the protective mechanism become insufficient, possibly due to repeated mild anaphylactic reactions, or is there a tendency toward an overgrowth of certain bacteria, notably proteolytic anaerobes, and may immunity be brought about in time? Whether these toxins are derivatives of the amino-acids we cannot say, but it is striking what slight changes in molecular constitution are necessary to convert the normal bases into products of great toxicity, and it is certainly possible that this may be brought about by the proteolytic intestinal bacteria. The work of Eppinger and Guttman in isolating two ptomaines from the stool, one producing urticaria, the other asthma, is extremely suggestive in this connection. Whether these toxic anaerobes are always present in minimal amount or whether they originate from external sources, such as tainted meat or pyorrheal pockets, has not been determined. That these poisons, produced by these bacteria or due to other causes, cannot often be demonstrated is not so much a proof of their absence as of their extreme complexity, and of the minimal amounts in which they must be present in urine, blood, and stool. The mechanical and surgical conceptions of intestinal stasis are quite insufficient to explain the symptom-complex presented. Back of the mechanics of digestion lies a problem far more complicated, far more difficult to solve, the problem of congenital or acquired hypersensibility to certain stimuli, the question of the overproduction of certain toxic substances, their chemical nature, and their possible specificity, and various questions involving more definitely physical factors, notably absorption and osmosis.

In the series it is hard to escape the conclusion that in the intestine certain substances are produced which in some instances are possessed of specific action associated with a hypersensitiveness to certain proteins not in themselves toxic but possibly capable of producing a reaction

because of an acquired hypersensibility, and that therapeutically a marked improvement in symptoms and even a complete cure may be brought about by the elimination of these substances from the dietary. It is also suggested by a study of these cases that by giving these foods in gradually increasing amounts a marked increase in resistance may be produced. That in certain cases at least the symptoms are better explained on the basis of a bacterial infection of intestinal origin rather than upon that of a toxemia, and that in various cutaneous lesions, testing the cutaneous sensibility by intradermal injection of various proteins is of real value in determining whether or not the condition may be due to certain toxic bases of intestinal origin derived from the decomposition of certain protein foods. These reactions are apparently specific in character—that is, are only found to be present when the toxins produced have a specific effect upon the skin—and therefore these tests of cutaneous hypersensitiveness to various proteins probably cannot be used as criteria of other conditions best interpreted as protein intoxications with manifestations elsewhere than in the skin.

A STUDY OF THE TOPOGRAPHY OF THE PULMONARY FISSURES AND LOBES IN INFANTS WITH SPECIAL REFERENCE TO THORACENTESIS.

In the *American Journal of Diseases of Children* for December, 1916, GITTINGS, FETTEROLF, and MITCHELL reach these conclusions:

1. The fissures of the lung in infancy show practically the same relation to the bony framework of the chest as they do in adults.
2. The origin, course, and termination of the fissures vary greatly in different individuals.
3. The variations apparently do not depend on any of the anatomic characteristics of the chest and cannot be predicted therefrom.
4. The lower level of the lungs in infants

and probably in young children does not extend quite as low as in adults.

5. For this reason, and owing to the anatomic characteristics of the bases of the pleural cavities in early life, great care should be exercised to avoid damage to the diaphragm in performing thoracentesis.

6. The sixth interspace in the midthoracic line and the seventh or possibly the eighth interspace in the line of the angle of the scapula (at rest) represents the lowest limits of absolute safety for thoracentesis in early life. [This is the important point to bear in mind.—Ed.]

HEART FAILURE DURING OPERATION TREATED BY CARDIAC MASSAGE.

Mr. W. M. MOLLISON, in the *Lancet* of November 25, 1916, reports a case of heart failure during an operation for the removal of tonsils and adenoids treated by heart massage through an abdominal incision, and recovery. The patient, a boy aged six years, was subject to asthma, but otherwise was normal. The C. E. mixture was taken from an open mask and light anesthesia reached in an ordinary manner, after which the left tonsil was removed. There was slight struggling during the removal of the right tonsil, after which the boy was turned onto the left side and the adenoids were curetted; during this there was no movement. Immediately after it was obvious that the boy had collapsed, with dilated pupils, absent corneal reflex, and no respiration. After all local and general restorative means, artificial respiration, injection of pituitrin into the heart through the chest wall, etc., had failed, the abdomen was opened and a hand inserted between the liver and diaphragm. The heart was easily felt and no trace of movement detected in it. It was massaged at the rate of about 90 pressures a minute. Respiratory movements began and continued intermittently; the color improved and the pupils diminished. The heart, however, did not contract. Pituitrin (1 Cc.) was injected into the heart; massage was renewed, and after

about 20 squeezes the heart began to beat strongly. The abdomen was closed and the patient was removed to bed, where saline was infused. After an hour he became restless, with choreic movements of the limbs. For seven days he was more or less unconscious, with rigidity of limbs or choreic movements, a frequent shrill cry, and incontinence of feces and of urine. At one time there was violence and tearing of the bedclothes. There were, in fact, symptoms of severe cerebral irritation, due presumably to the damage done to the brain during the cessation of circulation. At the end of fourteen days there was much improvement, and eventually the boy left the hospital well at the end of six weeks. Mr. Molli-son gave a résumé of previously recorded similar cases, and concluded that probably heart massage should not be postponed longer than five minutes after apparent stoppage.

THE DANGERS AND COMPLICATIONS OF TONSILLECTOMY.

In the *Medical Record* of December 2, 1916, MOORE writes forcefully upon this topic. He puts his views in these well-chosen words:

1. The remarkable number, regardless of its popularity, of fatalities and complications following tonsillectomy is astounding.

2. Thousands of unnecessary amygdalec- tomies are being performed yearly. A great many are being done on meager theoretical conclusions, the latter not being borne out by fact.

3. Tonsillectomies, being major opera- tions, should be done in hospitals, and the operator should be a specialist, experienced in this work. Menges says that three days in a hospital should be the shortest stay demanded of them.

4. Hospital interns should be instructed in the control of postoperative hemorrhage. The use of the compressor, cautery, artery forceps, ligature, suture of the pillars, and the employment of adrenalin and silver nitrate, should be explained to them.

5. Unless absolutely necessary, operations

at the home, dispensary, and the physician's office should be abandoned. Sepsis and hemorrhage are too frequent complications.

6. All patients and parents should be in- formed that there are possible dangers and complications following removal of the tonsils.

7. Levy says that in all cases the surgeon should make sure before operation that there has been no recent case of illness in the house.

8. Cocaine and adrenalin injections should not be made into the soft tissue sur- rounding the tonsils. Such a procedure is dangerous (Sheedy).

9. Singers should be informed that ton- sillectomy may injure the voice.

10. When possible, a pathological exam- ination should be made of all tonsils re- moved. Many will probably be found to be normal.

11. Conclusions as to tonsillary hyper- trophy should not be made immediately after an attack of acute tonsillitis. Inflam- matory enlargement may subside several months later (Still), and operative interfer- ence may be unnecessary (Layton).

12. The tonsils should be viewed as normal and not guilty until proved ab- normal and guilty. The standard of surgi- cal interference should be the avoidance of operation when possible, instead of razeeing the tonsils out on the slightest pretext. Intelligent surgeons are now preserving tissue as much as possible, as the prepuce, ovaries, tubes, chronically inflamed appen- dices, gall-bladders, inferior turbinates, and, in military surgery, the limbs.

13. The conservative laryngologist should always be the one to judge of the local condition of the tonsil. Physicians in gen- eral, unless they have been especially trained in nose and throat work, will not have had sufficient experience to pass on the pathology of the tonsil. The laryngolo- gist would be wise, however, to consult an experienced internist, who has medical equipoise, when the question of tonsillitis in reference to constitutional diseases pre- sents itself for decision.

14. Still's indications for tonsillectomy

are sound. Mere uncomplicated tonsillar hypertrophy does not call for operation. Practically complete tonsillar involution takes place in the majority of children about the age of puberty.

15. Take a nose and throat culture in all cases before operation, as the patient may be a carrier, as diphtheria has occurred immediately following tonsillectomy, even in cases in which only a throat culture was taken and found negative, the culture from the nose being neglected.

16. In all cases test the coagulation time of the blood. Perform no operation on any one when the clotting time registers beyond one minute and a half. Thrombokinase, as used at the Manhattan Eye and Ear Hospital, which acts on the fibrin ferment of the blood and forms a clot, is useful in controlling oozing. Also in these cases of delayed clotting time administer calcium lactate for several weeks prior to the operation and then test the clotting time of the blood. Use calcium lactate especially in cases of the lymphatic type. Wilson has proved by the coagulometer that the blood-clotting time in adults can be reduced from seven minutes to one minute after the administration of 120 grains of calcium lactate. Fonio's "separierende methode" determines which of the elements of the blood is lacking in the individual case. Fonio's "coagulen" (blood platelets) is a valuable hemostatic. Horse or rabbit serum can be tried. Hess uses "tissue extract" as a hemostatic, applying it locally in cases of hemophilia. It has been used after tonsillectomy. The injection of human blood or serum, preferably familial, or diphtheria antitoxin, can be employed. Transfusion, by the multiple syringe method, may be used.

17. It appears to be a good plan to test the bleeding time of blood by Duke's blotting-paper method. The bleeding point is independent of the coagulation time, so that it may be normal in a case of jaundice, in which the coagulation time is very much delayed, or in a case of hemophilia. If the platelet count is diminished, then a delayed bleeding time indicates a hemorrhagic dia-

thesis. Normally it is one to three minutes. It is delayed where the platelet count or the fibrinogen content of the blood, either occurring separately or at the same time, is excessively reduced. Constitutional purpura is characterized by prolonged bleeding time with normal coagulation time.

18. Ligate and stop all bleeding points after tonsillectomy, as in all other surgical procedures. Thompson's test, keeping the child on its side near the edge of the table, the foot of the latter being elevated, is a good one. Any bleeding comes out of the mouth and is discoverable.

19. Avoid shock by using ether in most cases. The effect of ether is exerted wholly through its action on the suprarenals. Coagulation processes are hastened by ether anesthesia.

20. The wisdom of the prophylactic removal of tonsils appears to be very questionable. Results thus far by competent observers have not justified the indications in most cases.

21. Operate on no patient with an elevated temperature, as the patient may be in the incubation stage of measles, scarlet fever, or diphtheria (Layton). Richardson, however, reports a subacute case in which, after the patient had been running an elevated temperature for several months, the fever disappeared following a tonsillectomy.

22. Operate in no case in which the constitutional or local condition is acute, as in arthritis, neuritis, coryza, tonsillitis, habit spasm (Still), or when the patient is still convalescing from influenza. The reaction may be worse than the presence of the tonsils.

23. If avoidable, never operate in the winter months. Bronchitis is more apt to follow such a procedure (Still). Layton of Guy's Hospital performs no operation on the out-patients during the winter.

24. Perhaps it would be a good plan for laryngologists to take up the question again of the local treatment of chronic tonsillitis and tonsillotomy. Pybus says, where the symptoms are only mechanical, partial removal may suffice. Comroe expresses the

hope that many tonsils may be rescued from unnecessary and undeserved slaughter.

25. The snare or dissection method (Bal-four) probably surpasses any guillotine method. Finger dissection helps to avoid severe hemorrhage (Richardson).

26. When the diphtheria bacillus, in carriers, is once lodged in the tonsillary recesses, causing repeated attacks of diphtheria, it is difficult to get rid of; the tonsils should then be enucleated (Pybus). Malignancy is, of course, an indication for their removal.

27. The "follow-up" system of recording results should be instituted wherever possible.

28. More attention should be paid to oral asepsis, before and after tonsillectomy. Treat diseased gums and carious teeth prior to the operation. No abdominal surgeon would operate for chronic appendicitis with a furuncle in his line of incision.

29. Inquire into the history of jaundice, hemophilia, purpura, erythremia, the anemias, and diabetes before operating. Hemophilia is rarely dangerous after the twenty-fifth year. As the skin and cellular tissue in diabetics are readily invaded by the microbes of suppuration, and as the multiplication of these microbes is singularly favored by the presence of sugar in the tissues (Bujvid), it would appear unwise to perform tonsillectomy upon a diabetic. Those suffering from diabetes stand all operative procedures badly.

30. Look for other foci besides the tonsils, and other etiological factors, and then try generally accepted treatment for the various chronic systemic diseases, before attacking the tonsils.

31. Tonsillar inflammation in those subject to occasional attacks of tonsillitis becomes more infrequent and may disappear altogether when middle age is reached.

32. Tonsillectomy for arteriosclerosis and heart disease, in the light of our present knowledge, is absolutely unjustifiable. Sclerosed arteries retract and contract with difficulty, and severe hemorrhage is frequent in these cases and difficult to control.

33. Tincture of iodine (Marquis) ap-

plied to the tonsillar fossæ after the operation, throat gargles, and compound tincture of benzoin, when used in the postoperative period, are useful applications to be made to help the disagreeable postoperative condition.

34. Perhaps the postoperative sloughing can account for some of the sequential systemic reactions in joints and other tissues. Systemic absorption of toxins is the rule from acute septic areas.

DIAGNOSIS AND GENERAL TREATMENT OF SYPHILIS.

FORDYCE (*American Journal of the Medical Sciences*, October, 1916) concludes a careful study of this subject as follows:

The fate of the syphilitic individual depends upon the early diagnosis of his infection and the intensity with which treatment is carried out in the first six months. In the accomplishment of this purpose the modern aids to diagnosis have rendered great service. The dark-field illumination furnishes a valuable means of corroboration in all suspicious genital sores and assists in determining the nature of extragenital lesions which may simulate chancre. It should be employed in every case of chancroid to confirm or rule out the possible coincident infection with the *treponema pallidum*.

The Wassermann test fills a large field of usefulness not only as a diagnostic medium but as a guide to the effect of treatment and criterion of cure. It is of special value in all conditions of obscure etiology referable to the cardiovascular system, cerebrospinal system, or viscera in which syphilis might be a factor, and in cases with an indefinite clinical picture, such as neurasthenia, febrile attacks, rheumatic pains, etc. Its interpretation is of great importance and requires as much training and experience on the part of the practitioner as does the interpretation of the physical signs.

The examination of the spinal fluid enables us to determine the activity of the luetic process in the brain or cord, to distinguish the various pathological types affecting the central nervous system, and in

many cases to differentiate between these and non-syphilitic affections. Recent investigations have shown that an analysis of the spinal fluid is not complete unless the Lange or colloidal gold test is performed in addition to the Wassermann reaction and a cytological and chemical examination. Its chief usefulness lies in distinguishing true paresis from types of cerebrospinal syphilis which simulate it, and in diagnosing incipient cases before the clinical syndrome is established. This affects chiefly the prognosis, as our main hope lies in the early diagnosis and treatment of these cases, for when degenerative stigmata are already present the outlook is not so encouraging, for sooner or later relapses occur.

In primary syphilis where the spirochetes are demonstrated and the Wassermann reaction is negative it is possible to cure syphilis with salvarsan alone. It cannot be determined how many doses are required, and as there may be a dissemination of spirochetes even in the presence of negative Wassermann reaction it is better, therefore, to err on the side of safety and to give at least eight to ten doses and follow this with mercury for perhaps six months.

In secondary syphilis when the early rash is present and the Wassermann positive, it is better to precede the salvarsan with several injections of a mercurial salt, preferably a soluble one, on account of the economy of time. In this way an effect is produced on the spirochetes, and when salvarsan is given the temperature reaction and an intensification of the rash—that is, a Herxheimer reaction—can be avoided. After the salvarsan is begun the treatment is to be continued in the manner outlined in the body of the article. The dermatologist and syphilologist should keep in mind the possibility of the involvement of the nervous system in secondary syphilis, and a complete study should be made when the patient comes under observation so that this record can be compared with any subsequent developments. In this way we are often enabled to detect the very earliest changes which manifest themselves objectively in the nervous system. The most

frequent are irregularity of the pupils, persistent headache, and optic neuritis, or auditory disturbance.

In latent syphilis with a positive Wassermann reaction an investigation should be made of the cardiovascular and of the nervous systems, or of previous involvement of any of the viscera, as, for instance, syphilitic hepatitis. In cardiovascular syphilis the prolonged use of mercury in connection with potassium iodide is probably of more value than the haphazard use of occasional doses of salvarsan. In other words, in tertiary syphilis with a persistent positive Wassermann reaction without involvement of the central nervous system the beneficial effects of potassium iodide cannot be too strongly insisted upon. In bone and periosteal lesions attended by severe pain there is no drug in the Pharmacopœia that produces so rapid an effect in relieving the pain and reducing the neoplasm.

The criteria of cure are a negative Wassermann reaction for at least a year, continuing so after a provocative injection of salvarsan, and a normal spinal fluid, with the exceptions which have been noted.

Swift holds that no case should be released from treatment until the cerebrospinal fluid has been shown to be normal in so far as pleocytosis and Wassermann reaction are concerned. A fair proportion of patients with syphilis are still poorly treated, and the majority of them are released without lumbar puncture. The value and interpretation of laboratory methods should always be based on the most careful study of the case in which it is applied. Any normal reaction in the cerebrospinal fluid may be present or absent in any luetic involvement of the brain or spinal cord. An increase of globulin is found in most cases of any type, but is most marked in paresis, although it may be equally intense in secondary meningitis. Pleocytosis is usually the most intense in meningitis in the secondary stage, but counts above 100 are not infrequent in later cerebrospinal syphilis, tabes, and paresis. The type of curve given by the Lange gold reaction in cerebrospinal lues and tabes is of confirmatory value, but

its great field of usefulness seems to be in differentiating paralytica dementia from these two conditions. The fact that the fluid from a patient with a clinical diagnosis of tabes, or cerebrospinal syphilis, gives a paretic curve does not militate against the reaction, for it is well known that between 10 and 15 per cent of tabetics develop paresis, and at times it is impossible to differentiate between cerebral syphilis and paresis. If future observations confirm what now seems probable, namely, that a paretic curve obtained with the spinal fluid of patients clinically not paretic points to a possible development of this disease, it will be of importance in prognosis and of value in determining why symptoms of mental disorder appear in spite of vigorous and prolonged treatment.

A PLEA FOR THE TABETIC.

GROSSMAN (*Interstate Medical Journal*, November, 1914) under this title contributes an article serviceable from its comprehensive brevity and sound common sense. He lucidly explains the reason for this class of sufferers falling readily into the hands of irregular practitioners. It is because of the common tendency of the American profession when they diagnose a case of lumbar ataxia to give prompt and unfavorable prognosis and to dismiss the patient with a few words of gloomy advice and perfunctory pity. Such a patient is subject to tremendous influence through his psychic state, and hence may be benefited and greatly benefited by one or many forms of treatment which in themselves have little or no effect. Moreover such treatment may come at a time when the patient is subject to one of those remissions so common in all chronic infections. Nor can it be doubted that the ablation of the toxic focus is at times so markedly helpful to the tabetic as to amount almost to a cure. The treatment considered is first that directed against the apparent cause of the disease, and second, that directed against its symptoms. Medicinal treatment directed against any active luetic process, the combined use of sal-

varsan intravenously and the salicylate of mercury intramuscularly, has proved to be the method giving the best results; 0.2 to 0.4 grm. of salvarsan should be injected intravenously at intervals of from seven to ten days for six injections; in the intervals injections of mercury may be given, they being continued for ten weeks after stopping the salvarsan. The salicylate is given in doses of one-half to one grain twice a week. After one month's rest the same process should be repeated until the activity of the disease as indicated clinically and by biological reaction is arrested. Intraspinous injections of mercurials and salvarsanized serum seemed to be distinctly serviceable, though it has been shown that the spinal fluid twenty-four hours after the intravenous injection of salvarsan contains more arsenic than it does immediately or shortly after the injection of the so-called salvarsanized serum. In the dose of the latter but 0.0001 grm. of salvarsan is found.

As to symptomatic treatment, pain is one of the most common and distressing symptoms of tabes. It may last minutes, hours, or days, and may be of almost unbearable intensity. It is usually in evidence when there is excessive humidity in the air or lowered barometric state. Local measures should be used, such as dry heat, cauterization, massage, tight bandages, etc. Aspirin, antipyrin, salicylate of soda, and codeine are the most efficient of the milder drugs. As a last resort morphine may be needful. It should be used with extreme caution and as a rule without the knowledge of the patient. Bladder disturbances, which occur in about 80 per cent of cases and which consist of dysuria, hyperesthesia of the neck of the bladder, followed by frequent micturition, dribbling, and various degrees of retention, may be helped by strychnine and ergot in small doses. Of the utmost importance is the training derived from emptying the bladder at short intervals, at most every four hours. A danger that must not be underestimated is that of infection. A catheter must be used in a thoroughly cleanly manner. The ataxia present in about 75 per cent of the cases begins

insidiously in the lower extremities, often by tiredness and unsteadiness, with a tendency to stumble easily, especially in the dark. Frenkel elaborated a system of exercises so designed as to reëducate the ataxic muscles by a graded coördinated movement. The patient is trained at first to stand and to use his eyesight to compensate for the loss of his joint and muscle sense. Simple training movements are then added, such as touching with the toe a figure marked upon the floor, later walking movements in which the patient attempts to follow accurately a series of footprints, marked at various distances upon the floor. Later walking movements in which the patient attempts to follow accurately a snake-like course, turning, etc. Finally walking up and down stairs is taught. There are few patients who have not improved to some extent, and a few are so much better that they can walk unattended in public. Relapses are common. Maloney's method is based upon first the teaching of coördinated movements blindfolded; second, the correction of the mechanical defects usually found in all tabetic feet; third, the treatment and elimination of the psychic components of ataxia, the principal one of which is fear.

Maloney's method is thus applied: Mechanical measures; these consist of plates, shoes, and knee-caps, by means of which we endeavor to correct any mechanical disabilities present. Casts of the foot at rest and when bearing the body weight are taken, and a suitable plate to correct defects of the arches is constructed therefrom. The type of plate used is a modification of the Whitman plate, the inner lip being curved below the level of the scaphoid; the outer flange is lower and does not extend so far forward; and the support of the transverse arch extends outward beneath the four inner toes. When the spread is great, the inner lip extends forward to include the metatarsophalangeal joint, surrounding it completely on the inner side.

A high shoe, especially strengthened on the outer side of the ankle, increases the

support of the ankle and prevents the foot from turning in. The heel is low and wedge-shaped, the base of the wedge being on the ground, and is continued along the outer side of the shoe. A welt, as broad as the patient will permit (usually about a quarter of an inch), projects. A wooden shank is placed in the sole to prevent bending. The shoe should be as light as is consistent with maintaining its shape. When the shoe is on the ground, it rests on its whole bearing surface. The patient gets support from this broadened surface simultaneously. He does not oscillate every time he puts his foot down. He feels more secure; he really is more secure. He is readily weaned from the straddle-legged attitude, which is so disconcerting to coördinated walking. The occasional giving at the knees has a very demoralizing effect upon the ataxics. To avoid this giving, the knees should be lightly supported by an elastic bandage.

The educational exercises are coördinated movements and balancing. The breathing exercises are carried out by putting the patient blindfolded upon a bed, directing him to inspire deeply, using his diaphragm and restricting his thoracic movements. At the height of inspiration he is asked to pause, then slowly and evenly to expire to the fullest extent and again pause. A small sand-bag is placed upon the abdomen. After six or eight deep breaths have been taken the patient is asked to take about the same number, but not quite so deep, shortening the pause, then slowly and evenly to expire to the fullest extent and again pause. After this medium breathing is mastered, the depth of the respirations is further decreased, and the pause is shortened until the patient is breathing quietly and regularly as if asleep.

To relax the muscles, passive movements in which the muscles are alternately lengthened and shortened are employed. The muscles of the scalp, forehead, eyelids, cheek, and jaw are first passively moved until wrinkling and blinking of the eyelids diminish and disappear and muscular spasm is reduced or eliminated. Next the shoulder

is relaxed, then an arm; each in turn must be passively moved until all traces of muscular tension vanish and the part lies motionless and flaccid, and falls limply from any unsupported position.

From these relaxation exercises, practiced blindfolded, three results are obtained: First, ineffective, often useless and sometimes completely disconcerting muscular contractions which have been acquired in attempts to balance are eliminated, so that the coördinating exercises can be begun on an unconstrained musculature and not superimposed upon existing habit contractions. Second, active relaxation confers a great training in attending to muscular sense impressions. Third, the patient becomes less fearful and more receptive, because in so far as fear is maintained by its motor expressions in his attitude, it is diminished.

Movements are next begun. Passive flexion and extension of the ankles are first practiced. The foot is placed in extreme flexion, and the patient is instructed to count slowly while the physician, at a uniform rate, moves the foot to a position of complete extension. The purpose of the passive movements is to teach the correct direction and extent of each movement.

Next the patient lightly but steadily resists the passive movement. Then the movement is practiced, with the patient performing and the physician aiding and guiding. The physician's aid is gradually lessened as improvement occurs, and then the movement is executed by the patient alone; finally, the movement is made against resistance. It is essential that the movement should always be completed by the return of the limb to the position from which the movement started. During every movement the patient counts rhythmically. The purpose of the counting is to educate the patient to move easily and uniformly, and at a regular tempo. After the ankle, first the knee, then the hip of the same limb are educated. Besides flexion and extension, all the simple movements which can take place at the joint are practiced. All exercises are done without shoes; arti-

ficial aid should not be employed during the exercises. In every case, first breathing and relaxation, next passive, then passive resistance, then passive combined with active, then active unaided, and finally active resisted movements are practiced.

When the ankle movements have been acquired, then movement exercises are begun with the knee; when the knee movements have also been acquired, then ankle and knee movements are repeated before each attempt at hip movement, etc.

The repetition, after relaxation exercises, of a movement which can be proficiently performed, is a great aid in the learning of the next movement. The limb movements which are practiced in the recumbent posture may also, if possible, be practiced as occasion permits in the sitting posture. From the right lower limb we proceed to the left, breathing and relaxation; passive, resisted passive, combined passive and active, active and active resisted movements at each point are practiced as before. Before any attempt is made to teach progression, the trunk muscles must first be coördinated by relaxation and movement. This is usually easy, for the upper limbs seldom being ataxic may be used to practice lateral and forward thrusts, elevation to a sitting and resumption of the recumbent posture, with aid and against resistance. The head and neck muscles are similarly treated. Their treatment is just as important as that of any other part. The position of the head largely governs the attitude of the body. Too great stress cannot be laid on this preliminary training and attitude. The whole body must be taught to move harmoniously.

The first essential of stability in walking is stability at rest. After the exercises in recumbent and sitting postures are completed, the first attempt at progression is made. Knee-caps similar to those used by carpenters, but well padded, are tied on the knees and the patient is instructed in creeping. The change from recumbent to creeping posture does not unduly strain the patient's confidence in his powers of unaided blindfolded progression. The creep-

ing movements are conducted with the back as horizontal as possible; squatting must not be permitted. The tempo of the movement is again carefully regulated by counting. The direction is insured by means of a strip of carpet or linoleum upon which the creeping is performed.

After creeping has been practiced for some time, first changing from creeping posture to kneeling up, then rising from the sitting posture to the upright, are attempted. In the erect kneeling posture, progression is practiced. Progression in the creeping and kneeling postures trains a person to move his body automatically with his lower limbs.

This training is invaluable as an aid to walking. Finally walking is taught. To maintain direction during blindfolded walking, strips of carpet or linoleum are again used.

These strips may be arranged parallel with the walls of the room, so that the patient may at first feel his way. As he becomes more proficient, narrower strips are used until he is able to progress on a strip five inches wide. Relaxation should be as zealously practiced as are the movements, as in the beginning the education of muscular sense impressions must come mainly through these exercises reinforced by blindfolding and passive movement. The patient should be exhorted not only to relax daily at definite periods, but also to avail himself of every opportunity of relaxation. Every movement must be performed without strain. When during the exercises the performance is unsatisfactory, the indication is relaxation. At no time should the patient be allowed to become fatigued.

SYPHILITIC DISEASES OF THE EAR.

FRASER (*Edinburgh Medical Journal*, July, 1916) exhaustively reviews the importance of congenital syphilis as a cause of acquired deafness, it ranking after cerebrospinal meningitis and middle-ear suppuration; it is probably also causing many cases of "congenital" deaf-mutism. Estimates of the frequency of deafness in chil-

dren with this disease range from 33 to 60 per cent. In the secondary and tertiary stages of the acquired form of the disease sudden and severe deafness is of frequent occurrence.

In congenital syphilitic infants the lesions found are otitis media, sometimes with involvement of the labyrinth, delayed ossification of the petrous bone with abnormal marrow spaces; intrauterine meningitis and neuritis of the eighth nerve, changes in the blood-vessels, hemorrhages in the middle and inner ear, and changes in Corti's organ and in other parts of the labyrinth. Spirochetes have been demonstrated in a seven-months' fetus in the cochlear and vestibular nerves, and also in the facial nerve and in the tympanic and carotid plexuses.

In young children who are congenitally syphilitic Eustachian catarrh and middle-ear disease run an unfavorable course. Thus syphilis is to be suspected when the clinical course is not as desired.

The late type of congenital syphilitic deafness, occurring between the seventh and thirteenth years, may be due to neuro-labyrinthitis spreading from the meninges, to vascular changes (endarteritis), or to otitis media, followed by paralabyrinthitis or invasion of the labyrinth. The tympanic membranes are seldom normal in the late form of congenital syphilitic deafness. While this points to precedent attacks of otitis media, Fraser holds that in at least some cases such otitis is syphilitic.

In the late congenital form otoscopy shows a thickened membrane in about 88 per cent of cases. Bone conduction is shortened and may be absent. The upper bone limit is much reduced, and the lower bone limit is raised. In occasional cases the middle-ear type of deafness obtains.

As to the vestibular apparatus, in 24 cases examined, the reaction to rotation and cold syringing was absent in 14, reduced in 7, and normal in 4.

All of the stages of acquired syphilis have been observed in the ear. Chancre of the mouth of the Eustachian tube was formerly not infrequent from the use of infected catheters. Secondary syphilis of the

middle ear is probably much more common than is generally supposed. It may spread up the Eustachian tube from a nasopharyngitis and give rise to the symptoms and signs of catarrhal otitis media. The labyrinth too may be affected at this time. But one ear is commonly attacked. The onset of deafness is usually rapid.

In the tertiary period otitis media may not be solely due to the presence of the spirochæta, but the presence of syphilis certainly alters the course of the affection. Gummata may be present. In this stage the labyrinth is almost always involved.

It is not possible, however, at present to differentiate between labyrinthitis and affections of the eighth nerve. The prognosis of neurolabyrinthitis appears to be better in the secondary than in the tertiary stage.

In the treatment of this condition there is a strong impression among aurists that the administration of salvarsan alone is dangerous. The treatment should be started with mercury and the arsenical preparation added later. Some cases have been found to yield to salvarsan when mercury has failed, while the opposite condition has likewise been noted.

The central portion of the eighth nerve may be affected by gummata, aneurism, or scars; the peripheral portion by gummatous infiltration. Severe, often prolonged headache often precedes these conditions. Severe ear pain may occur in tabes.

Salvarsan is not as useful in ear syphilis as was at first expected; many regard it as a frequent source of trouble. It is important, as a prophylactic, to give syphilitic pregnant women careful treatment, and to give congenitally syphilitic children treatment for several years, whether or not they show symptoms of the aural disease. Inunctions and iodide should be given; Cheatle advises the addition of thyroid extract. Injections of pilocarpine and blistering are also commended. The results of treatment by the methods of Swift and Ellis and of Ogilvie are not available. The question as to whether involvement of the eighth nerve has been more frequent since the introduction of salvarsan is not settled.

It seems wise to administer mercury as well in the routine treatment of the disease.

After an injection of salvarsan the auditory nerve may be affected either "early" or "late." The "early" cases occur within the first twenty-four hours, and are probably due to swelling of the nerve in a narrow bony canal, in the presence of an active syphilitic process. Vestibular disturbance is characteristic. Complete recovery is the rule. The late cases occur four to six weeks after injection. The author does not express an opinion as to whether syphilis or salvarsan is the cause of the disturbance, but sums up the evidence as follows: (1) Cases of neurolabyrinthitis were common during the stage of secondary syphilis before the days of salvarsan, and are not infrequently met with at the present time in cases in which "606" has not been employed. (2) Similar attacks are recorded during treatment by mercury and iodides. (3) Examination of the cerebrospinal fluid in cases of "nerve relapse" appears to show that the condition is due to syphilitic meningitis (Voss). When the optic nerve is affected the changes appear to be inflammatory (Schanz and Tobias). (4) Cases in which salvarsan is vigorously pushed suffer less than those who receive a single dose (Ehrlich). (5) Syphilitic affections of the inner ear may be improved by the injection of salvarsan. (6) In the early stages of syphilis an endotoxin is formed which is liable to injure the acoustic, optic, and facial nerves or their terminations (Willcutt). (7) Long interval between the injection of "606" and the appearance of the labyrinth symptom, at least in some cases.

In favor of the view that salvarsan is the cause of the ear trouble: (1) Deafness has followed the use of salvarsan in a non-syphilitic case (lichen ruber) quoted by Lange. (2) Meningitic changes occur in the cerebrospinal fluid after the injection of salvarsan, though before the injection the fluid was normal. (3) Arsenic in large doses is a nerve poison (Evely, Pogany), and the eighth nerve is a *locus minoris resistentiæ*, especially in cases in which it is already affected by syphilis. (4) Japanese

waltzing mice suffer from a congenital lesion of the vestibular nerve. Ordinary white mice, when injected with arsacetin, become waltzing mice. Subsequent microscopic examination shows degeneration of the vestibular nerves (Rothig). (5) Alexander states that he saw fewer cases of labyrinth disease in syphilis during the seven years prior to the introduction of salvarsan than in four months after its introduction. (6) Failure of further doses of salvarsan to effect a cure of the condition. (7) Analogy between the effects of atoxyl on the optic nerve and salvarsan on the auditory.

SURGICAL TREATMENT OF ACUTE EPIDIDYMITIS.

MCKENNA (*Surgery, Gynecology and Obstetrics*, December, 1916) concludes an article with this title as follows:

Surgical interference is necessary only when the patient is suffering excruciating pain. When this procedure is carried out, it is quite necessary to divide the fasciæ so as to free the tension from the testicle as well as from the epididymis. Patients are less apt to be impotent if the posterior wall is divided carefully and the pus drained off than if the pus is left for nature to absorb. A blind-stab operation is that of a faker and should not be considered. It is not enough to expose the epididymis and drain it; all the fasciæ should be free.

It is not necessary to split the epididymis, but only the infected chamber which stands out clearly.

AN ABDOMINAL OPERATION FOR THE CURE OF CYSTOCELE.

Du BOSE (*Surgery, Gynecology and Obstetrics*, December, 1916) advises the following operation: After incising transversely the vesicouterine peritoneal fold, separation of the bladder by blunt dissection from the uterus completely and from the upper inch or more of the anterior vaginal wall is done, so that the bladder (being thoroughly mobilized) may be lifted well up and forward from these attach-

ments. The round ligaments on each side are caught, united, and attached to the most dependent part of the vesicovaginal denudation, with a linen suture passed well into the anterior vaginal wall. Another suture or series of sutures of linen approximates the frayed or torn ends of the vesicouterine ligaments and attaches them to the anterior and upper cervical portions of the uterus as represented by the untied suture. By letting the needle bite be far out laterally to include the ends of the vesicouterine ligaments, a narrowing of the anterior vaginal wall in its long axis occurs. The slack is also taken up in the relaxed pelvic aponeurotic diaphragm. Added to this restoration is the support of the round ligament folds. If these ligaments are attenuated and there is still a doubt that the relaxation and decensus will not be overcome by these supports, then artery forceps may be forced through the broad ligaments about on a line with the internal os laterally so that the forceps will catch in the bite the loose folds of the sacrouterine ligaments and pull them through. The ends of these ligaments are then sutured together with linen, and these ends in turn sutured to the denudation on the upper cervical portion of the uterus, serving to pull upward and backward the cervix uteri, and to take up the slack in the relaxed sacrouterine folds. Successive tiers of chromic catgut sutures are placed so as to approximate the bladder on the uterus at a much higher level than its former normal attachment. Before this suture line is completed, it will be found easier to plicate with linen the round ligaments on each side, including in the suture the wall of the uterus laterally and the incised edge of the broad ligament peritoneum. This fine linen or silk suture continues until the plicated round ligament approximates its original attachment into the uterus, restoring its original point of traction on the fundus uteri. One or more catgut sutures are placed between the uterus and bladder until the former reflection of the bladder is raised to the fundus and attached by a running suture (of catgut in the fertile, linen in the sterile) along a line

running above the uterine insertion of the round ligaments. The operation is completed by a continuous suture turning in and approximating the peritoneal edges of the bladder laterally to the broad ligaments and to the fundus of the uterus above.

THE PRESENT CONCEPTION OF CON- GENITAL SYPHILIS AND ITS MODERN DIAGNOSIS.

ROSTENBERG (*Medical Record*, July 1, 1916) after alluding to the now commonly accepted fact that spirochetes are carried from the mother's placenta into the fetal blood-vessels, thus establishing a condition which practically corresponds to the early secondary stage of acquired lues, refers to the experiments of Finger and Landsteiner, who have successfully inoculated monkeys with the spermatid fluid of a syphilitic man and obtained luetic manifestations, thus proving the contagiousness of syphilitic spermatid, in spite of the absence of spirochetes in the spermatozoon.

Bab also found a positive Wassermann reaction in the spermatid obtained from syphilitics. This may explain the cases in which a healthy mother conceives from a syphilitic father who does not show any infectious lesions anywhere; the mother without having had a primary lesion develops early secondary symptoms in the first half of her gestation; an abortion usually follows, and the fetus shows all the earmarks of congenital lues. It is generally accepted that maternal syphilis will persist in its infectivity much longer than a paternal one. Therefore we see cases in which a syphilitic woman joined in marriage to a perfectly healthy man bears him syphilitic children. Such transmissions have been observed as much as twenty years after the mother was infected. In all cases of pregnancy in which there is a positive Wassermann prompt intensive treatment is indicated. Lues should be suspected in every case of abortion or miscarriage occurring in an otherwise apparently healthy woman. Ruge in a series of 94 abortions found lues as the cause in 78. The syphilitic child born dead is usually macerated and

the placenta is much larger than normal. The majority of congenital syphilitic children surviving their intrauterine infection are born with a clear skin and apparently in perfect health. Symptoms develop in the first three months; snuffles and skin eruptions are perhaps the most prominent. The Wassermann may be negative in the case of the child; it is usually positive if the mother's blood be taken.

THE IMPORTANCE OF THE PROPER DOSAGE OF SODIUM CITRATE IN BLOOD TRANSFUSION.

LEWISOHN (*Annals of Surgery*, November, 1916) concedes that sodium citrate is exceedingly toxic when introduced in large quantities into a human being. Five grammes can, however, be safely given to the adult without risking the toxic effect in 0.2-per-cent doses. This allows us to transfuse as much as 2500 Cc. of blood at a time—more than it is ever desirable to take from a donor or introduce into the recipient. Lewisohn has made 75 transfusions in 62 cases, the youngest being an infant ten days old, and has seen no sign of toxic effect in any instance. Chill has followed in 10 per cent of the cases. Lindeman gets chill in the same percentage, using unmixt blood. It is quite certain that any method will give about this percentage of chills. Nor does this chill lasting but a few minutes interfere in any way with the clinical results of transfusion. In a large series of cases which received repeated transfusions, two different methods were used—the citrate method and the Unger apparatus. Citrated blood does not show any changes from the normal blood picture. Blood mixed with sodium citrate at the rate of 0.1 per cent will clot just as quickly as normal blood. If one adds a minute amount of citrate, making the percentage 15 cgm. of citrate to 100 Cc. of blood, such mixture will stay fluid for at least two days, and it is perfectly feasible to use a 0.15-per-cent mixture for the citrate method of blood transfusion, but it would have to be made very accurately. The slightest error under 0.15 per

cent would cause rapid coagulation. For this reason the 0.2-per-cent mixture is advised.

The great majority of the reports profess perfect satisfaction with the 0.2-per-cent dose. Brem has carried citrated blood (0.2 per cent) as far as seventy miles before he injected the mixture. There is no objection to the use of a dose slightly larger than that originally indicated as long as proper care is taken that the toxic level is not reached. A large clinical experience has shown, however, that 0.2 per cent is an absolutely safe percentage. It is important that a large size needle be used in collecting the blood from the donor. Citrated blood mixes only after the blood has left the needle. The use of a cannula with narrow lumen will not permit a free flow, and the blood may clot before it mixes with the citrated solution. The correct way to obtain the proper percentage is to collect 180 Cc. with 20 Cc. of a 2-per-cent stock solution.

Weil has reported the important fact that the coagulation time of the recipient's blood is shortened after the injection of citrated blood, but soon returns to its previous level. Ottenberg has reported a case in which after injecting 150 Cc. of citrated blood (0.2 per cent) the coagulation time dropped within ten minutes from one hour and twenty minutes to seventeen minutes. After twenty-four hours the coagulation time had gone back to one hour and fifteen minutes.

GUNSHOT WOUNDS OF PERIPHERAL NERVES.

STOOKEY (*Surgery, Gynecology and Obstetrics*, December, 1916) states that with the use of high explosives and bullets with high velocity the frequency of nerve lesions has increased.

Peripheral nerves may be injured by direct violence of projectile and by the violence imparted to bits of bone or even foreign bodies.

Peripheral nerves may be implicated secondarily by scar tissue, or callus, or both.

Diagnosis cannot be made before oper-

ation between anatomical and physiological division. Diagnosis can usually be made in cases with incomplete division.

In war surgery primary suture is rarely possible, due to infection.

Exploratory operation is indicated when a diagnosis of complete division is made. Delay in operating usually means delay in return of function.

Nerve-freeing is in many cases to be preferred to excision and suture. When the nerve is widely implicated and there is a large loss of continuity, it is better to do nerve transference or nerve transplantation than tubulization or suture with the nerve under tension.

Stretching of the nerve should not be done, as it causes karyolysis of the nerve cells in the anterior horn, with subsequent degeneration of the nerve axon in the proximal nerve-trunk.

Efficient splinting to prevent contractures and overstretching of the muscles is imperative, both before and after operation.

The terms epicritic and protopathic tend to be confusing. Greater accuracy is in use of specific terms, as area of cotton-wool, area of pin-prick, areas of moderate and extreme degrees.

Musculospiral nerve injured in its lower third shows loss of sensation on a narrow band over dorsum of thumb, usually only loss to cotton-wool and temperature sense.

Injury to musculospiral nerve may cause dissociation of temperature sense in the area on the dorsum of the hand—without loss to cotton-wool.

The median nerve does not supply any skin on the dorsum of the thumb; supplies up to line in continuation of lateral borders of nail.

The anterior cutaneous division of the ulnar nerve supplies the skin in the same manner as does the median nerve—i.e., on to dorsum of fifth and part of fourth, middle, and distal phalanges. The posterior cutaneous division supplies the ulnar side of the hand and the proximal phalanx of the fifth and part of the fourth.

The action of extensors assists the interossei in separating the fingers. To test for

paralysis of the interossei, have the patient bend his fingers at right angles at metacarpal phalangeal joints; prevent effort of extensors by holding the fingers across; then have the patient try to separate his fingers gently.

Return of motor function begins with the muscles which first receive their supply below the lesion. The return is earlier the nearer the lesion is to the periphery.

Trophic ulcers occur only after trauma. Their repair appears to be no different from that in other parts.

Functional disorders may be superimposed on organic peripheral nerve lesions. Usually they are readily recognized.

TREATMENT OF WOUNDS IN WAR BY MAGNESIUM SULPHATE.

MORISON and TULLOCH (*Journal of the Royal Army Medical Corps*, October, 1916) state that from a clinical point of view hypertonic solutions to produce their ideal results must have the following properties:

They must not be easily absorbed.

They must stimulate the growth of granulations in the whole of the wound, and these granulations must be firm, compact, and vascular.

Their application to wounds must be simple and easy, and the changing of dressings containing them infrequent and painless.

The application of magnesium sulphate fulfils these requirements. It is not absorbed, the granulations formed under it are ideal, the dressings, even in the most septic cases, need only be changed twice a day, and its use is painless. It has the additional advantage of being cheap, readily procured, and easy to handle.

In no case so treated have there been any symptoms of absorption (pain, thirst, diarrhea, rise in temperature).

Secondary abscesses and lymphatic infections have not occurred. Many patients have expressed their satisfaction as to the painlessness of the dressings.

The type of granulation produced by magnesium sulphate is such that very little

absorption is possible from it. A sloughing suppurating wound is converted under it in a few days to a bright-red, flat, compact, granulating surface, which lends itself to the rapid growth of epithelium from its edges. In deeper wounds, and where the bone is injured or laid bare, a similar result may be anticipated. It is the rule that sepsis is held in check, suppuration disappears, healthy granulations soon cover the bare bone and tendons, and the amount of necrosis is diminished or even entirely prevented.

The condition of the wounds when convoys arrive from overseas demands attention. The dressings generally consist of gauze which has been moistened with some solution and covering it a quantity of cotton-wool. The wound, soon after the application of such a dressing, becomes dry from evaporation, so that difficulty is experienced and pain caused by removing the dressings which have become adherent to the wound. In the deeper wounds discharges are pent up and the condition of the patient and the wound suffer. The simplicity of application of magnesium sulphate, and the infrequent changes of dressing necessary, allows of several cases being attended to in a short time, and makes it the ideal dressing for wounds where the transport of the patient is necessary, and these deleterious results are likely to happen.

A saturated solution of the salt has given the best results, both clinically and experimentally—forty ounces of magnesium sulphate (by weight) are dissolved in ten ounces of glycerin and boiling water sufficient to make a Winchester quart (by measure). The glycerin must be added slowly while the solution is hot and stirred gently, or the salt precipitates on cooling. The solution is then sterilized in an autoclave and is ready for use.

In recent injuries the wound is freely opened up, any foreign body, bullet, portion of shell, clothing, etc., is removed, and the whole wounded surface is swabbed over with pure carbolic acid. In the case of fractures, the ends of the bone are treated in the same way, and free fragments of

bone are removed. The wound is gently packed for twenty-four hours with gauze wrung out of carbolic lotion (1 in 20) and antiseptic wool applied as an outer dressing. At the end of this time the wound is dressed, the gauze plug is removed, the wound is syringed out with magnesium sulphate solution of the strength indicated above, no swabbing of the wound is done, and the wound is loosely packed with sterile lint taken out of the magnesium sulphate solution in which it is constantly kept. The strips of lint used are narrow (from half inch to one inch wide), so that the solution with which they are saturated comes in contact with all parts of the wound surface. A double layer of lint, wet with the solution, covers the whole of the surface wound. This is covered with a piece of jaconet and then cotton-wool, the whole dressing being fixed loosely by a bandage. In the case of wounds of a later date, where sepsis and suppuration are fully established, the treatment by carbolic acid is omitted and magnesium sulphate solution is commenced at once. Dressings even in the worst cases are changed only at twelve-hour intervals, thus saving a patient much discomfort and trouble. The effect on the wound is very striking. In two or three days pus has almost disappeared, sloughs begin to separate, and the whole surface presents a bright-red color. The granulations never become flabby or edematous, but instead a firm, vascular, healing wound is seen. Scratching the surface of the wound with a probe hardly disturbs the vascular granulations. The growth of epithelium from the edges of the wound proceeds vigorously; the treatment may be continued with advantage until the entire wound is healed. The resulting scar is firm and elastic and seldom tends to contract or to become painful.

Constitutional symptoms seldom occur, probably owing to the fact that on account of the density of the granulations absorption does not take place. There is no general disturbance of health. There is an absence of lymphatic and glandular infection, and secondary abscesses have been in the authors' experience unknown.

The effect in the majority of compound fractures is very quickly manifest. Pus rapidly disappears and the amount of necrosis in comminuted cases appears, as would be expected when infection is diminished, to be materially less.

In the wards about a Winchester quart of the solution is used every day in dressing about forty cases, and the cheapness of the lotion, with the infrequent dressings required, means no inconsiderable saving of expense.

From the first series of experiments it appears that Mg_2SO_4 exhibits to a greater degree than do the other salts investigated the desirable property of interfering with the digestive activity of pus.

This statement is made with reservation as the experimental methods that one is forced to employ are open to certain criticisms, and it is suggested that the rate of epithelialization of the wounds treated would give a truer index of the property than experimental investigation does.

Magnesium sulphate has not so markedly inhibitory an action on phagocytosis as one would expect, and, therefore, even if it be absorbed to a slight extent, it would not have a deleterious influence on the process, while salt, being more readily absorbed, might well interfere with this function of the leucocytes.

Experimental work in physical chemistry and pharmacology points to magnesium sulphate as the least absorbable of the readily soluble salts, while clinical evidence—absence of pain, etc.—points in the same direction.

By virtue of the non-absorption of magnesium sulphate the granulations produced are more compact than when a more readily absorbable salt is employed.

The Mg ion has a markedly inhibitory effect on the growth of pyocyaneus. It has, however, no easily demonstrable influence in the concentrations examined, on the growth of staphylococci, or on the diphtheroids investigated.

Incorporating these conclusions in a final note one may say that it appears from the above findings that magnesium sulphate

would be the most satisfactory salt to employ for the production of "lymph lavage," and its properties indicate that it might be used satisfactorily and safely in the form of a fomentation.

Stress is laid on this last point, for if the fomentations only require renewal twice daily the dangers of manipulation are much reduced and the work of the wards is lightened.

The authors point out that they do not suggest that magnesium sulphate solutions ought to be employed for a first dressing for fresh wounds. These dressings they think should be strongly antiseptic in character, their function being prophylactic rather than curative. It was as a curative dressing in the succeeding phase that they suggest magnesium sulphate might be made use of with great advantage.

OBSERVATIONS ON ONE HUNDRED AND THIRTY-THREE CASES OF GALL-BLADDER SURGERY, WITH ESPECIAL REFERENCE TO THE POST-OPERATIVE TREATMENT.

RHODES (*Surgery, Gynecology and Obstetrics*, October, 1916) on the basis of 133 cases in which the gall-bladder was drained describes the postoperative treatment, which consists in putting the patient in bed in the prone position and giving nothing by the mouth. Proctolysis was employed, using either water, dextrose, or sodium bicarbonate, either separately or in combination as indicated, and morphia gr. $\frac{1}{8}$ hypodermically every three hours if needful. In 77 cases the average duration of drainage was something over thirty-five days. In 56 cases it was something over twenty-nine days. In the latter series the treatment was supplemented by hexamethylenetetramine 50 to 80 grains daily. The author concludes that those having this drug have an average drainage of about a week less, that the drainage improves faster, and that the end-results are more satisfactory inasmuch as not one who was given it had any symptoms referable to the gall-bladder after leaving the hospital, as contrasted with at least four among those who did not.

TREATMENT OF GAS GANGRENE BY THE INTRAVENOUS INJECTION OF HYPOCHLOROUS ACID.

FRASER and BATES (*British Medical Journal*, Aug. 5, 1916) report briefly 78 cases. Four cases in which there was evidence of serious toxemia ultimately recovered following the administration of hypochlorous acid, while two other cases died. In one there was immediate very definite improvement following the treatment. The reading of these cases carries no wide information.

PRELIMINARY HEMOSTASIS IN GOITRE OPERATIONS.

DE QUERVAIN (*Surgery, Gynecology and Obstetrics*, October, 1916) notes that the thyroid gland is enveloped in a thick layer of its own fibrous tissue, called the capsula propria. Outside this there is a space containing fine layers of connective tissue and veins called the thyroid space. In front it is bounded by a layer of fascia, viz., the inner fascia of the sternohyoid muscle, which, more laterally, forms the median boundary of the blood-vessel sheath. This is called the thyroid fascia and corresponds to what is generally named the external capsule. More posteriorly this fascia separates into single lamellæ which take their way to the trachea, the esophagus, and the spinal column. Around the thyroid fascia we find another space containing muscles, viz., the sternothyroideus, the sternohyoideus, and a portion of the omohyoideus, which is called the sternohyoid space. The outer wall consists of a strong fascia, viz., the outer fascial covering of the sternohyoid muscle. As such it overlays the thyroid region stretching from there to the rear. At the outer side of this space we have the space containing the sternomastoid muscle.

The chief component of the median wall is the thyroid fascia, its anterior wall being formed by the thyrohyoid. Behind the blood-vessel sheath the inferior thyroid artery takes its upward course, penetrating the posterior portion of the thyroid fascia on the median side of the carotid artery.

The parathyroids and the recurrences—the latter within the field of operation—are both situated in the spatium thyroideum, for which reason, and because it contains numerous capsular veins, the thyroid space is avoided. Therefore we have at our disposal only the sternomastoid space. The operator frees the median border of the sternomastoid muscle and then penetrates between it and the fascia of the sternohyoideus. The jugular vein is always reached first and is liable to injury. Hence the author prefers the following course:

Kocher's collar incision is made, dividing at one sweep the skin, subcutaneous fat, and platysma myoides. The median border of the sternocleidomastoideus is drawn far outward with a blunt retractor so that the surface of the anterior fascia of the small muscles becomes visible. A vertical slit of about 2.5 to 3 cm. long is then made in the latter fascia, which is pared back bluntly and caught with a retractor. The finger then works deeply, in a median direction, along the median side of the common carotid. This vessel being released from its median surroundings the finger comes almost directly into touch with the inferior thyroid artery, which passes at a right angle to and underneath the carotid artery in a median direction. The artery is then lifted and ligated. As a rule no vein is encountered, excepting those on the surface. Sometimes the middle thyroid crosses the inferior artery. Ligation is rarely needful. Thereafter the required intervention may be practiced on the goitre itself. In a few cases the ligation of the thyroid artery was impossible owing to its too deep situation. In only one case of 276 ligatures was there permanent paralysis of recurrent nerve, and that not in consequence of the ligation, but of the shelling out of a cyst, between which and the posterior capsule firm adhesions had to be severed. In eight cases there was paresis incident to stretching the nerve during the process of luxating the goitre. This ligation also preserves the blood supply of the parathyroids. The superior thyroid can be ligated at a level with the thyroid cartilage. Ligation is only efficacious in cases

of diffuse and especially of extremely vascular goitres, and even then is not to be completely depended on. Indeed, only small diffuse goitres recede sufficiently.

TREATMENT OF FRACTURES BY NAIL EXTENSION.

DYAS (*Surgery, Gynecology and Obstetrics*, October, 1916) holds that the introduction of the point of a needle is of great importance. It should be driven through healthy tissue not infiltrated with blood, and a portion of the bone should be utilized which will not invade the medullary cavity. A situation close to the epiphyseal line is ideal except in the case of children and young adults, in whom epiphyseal ossification is incomplete. The joint capsule must be avoided. A small tenotomy incision is made down to the bone and the needle is hammered through, counter-pressure being made on the other side of the bone by a wooden block covered with sterile linen. When the point breaks the skin is freed by a small cut. Collodion dressing is put upon each wound.

The chief use of the nail is in the lower extremity. The optimum time for continued extension is eighteen to twenty-one days, though the needle may remain *in situ* for a considerably longer period. The author concludes as follows:

It is less dangerous than the radical open operation.

It enables the surgeon to exert the maximum amount of traction while using the minimum area for the attachment of the traction apparatus.

It will bring about a reduction of the deformity in old cases in which other methods fail.

The technique is not difficult and can be mastered by any one. Therefore the method is practical and can be used by the entire profession.

It gives access to wounds in compound fractures, permits of frequent dressings, and does away with unclean, infected fixation apparatus.

The disadvantages are apparent brutality

of the procedure. This is not real, however, as the patients suffer no more by this traction than by any other method.

Danger of infection is less than the danger of an open, radical operation.

Hemorrhage may occur, but can always be readily controlled by enlarging the incision and tying off the bleeding point.

CÆSARIAN SECTION.

JOHN COOKE HIRST (*American Journal of Obstetrics*, November, 1916) states that the old classical operation, with long incision and delivery of the uterus, is the easiest and hence the best for the occasional or inexperienced operator. It has certain grave disadvantages: (1) The greater likelihood of hernia, in the very long wound. (2) The greater chance of adhesion of the uterine wound to the abdominal. (3) The greater chance of contamination of the peritoneal cavity, especially after the uterus is emptied and while the uterine wound is being closed.

It is one of the methods to be considered in a clean case, but is not a safe method in a case in which contamination is suspected due to repeated examinations or futile attempts at delivery.

The patient's skin is prepared as for any abdominal operation, and in addition the vagina is cleansed and packed with sterile gauze.

As soon as the operation is begun, the patient receives, by hypodermic, two ampoules of aseptic ergot, and one ampoule of pituitrin.

A long incision is made, extending from half-way between the umbilicus and xyphoid to near the symphysis, and the uterus delivered outside the abdominal cavity.

Large gauze pads, with tapes attached, are packed behind, to either side, and in front of the uterus, to safeguard the peritoneal cavity from contamination.

An assistant, with both hands outspread, compresses the abdominal wall around the lower uterine segment. This is not to control hemorrhage, but to prevent blood and liquor amnii entering the peritoneal cavity.

To compress the broad ligament to control bleeding is a mistake, as it tends to favor subsequent relaxation.

The uterus is incised in the middle line, anteriorly. The placenta, if exposed by the incision, is disregarded. The child is seized by one leg and delivered. The cord is clamped in two places and cut, the child being held meanwhile head downward. The child is then handed to an assistant, to be revived, if needed, and the cord tied.

The placenta is delivered manually, and the membranes freed by gentle traction.

The first layer of sutures is begun by inserting a curved needle threaded with a long strand No. 2 chromic catgut, through the uterine wall above the wound and emerging in the upper angle of the wound, just above the endometrium. The cut muscle is then closed in two layers, by a continuous tier stitch, care being taken not to penetrate the endometrium. When the upper angle of the wound is reached, in the return, the needle penetrates the wall and emerges above the wound, opposite the point of insertion; the stitch is then tied. Thus no knot is buried in the wound.

The peritoneal covering of the uterus is closed by a continuous stitch of No. 2 chromic catgut, threaded on a straight needle, sewing from above downward, and on returning the needle is inserted between the insertions made on the downward trip. This stitch also is tied above the uterine wound, the complete stitch appearing like a laced-up shoe.

The uterus is returned to the abdominal cavity; any clots are sponged out of the peritoneum (usually only a small amount, if any, near the bladder), and the abdominal wound closed and dressed in the ordinary way.

The Saenger operation, with short high incision, has the very great advantage of preventing the coincidence of the uterine and abdominal wounds, and therefore minimizing the dangers of adhesions. The short wound is much less likely to be the site of a hernia. It is slightly more difficult than the old classical operation. The only contraindication to it in a clean case would

be a case of placenta previa where it was vital to prevent all possible loss of blood during the operation, as here the broad ligament cannot be compressed while the uterus is being opened as in the case of the long incision. Otherwise it is by all odds the best operation for the clean case.

The patient's abdomen and vagina are prepared as previously described, and the same dose of ergot and pituitrin is given when the operation is begun.

A short central incision is made, one-third above and two-thirds below the umbilicus, just long enough to permit the delivery of the head.

An assistant compresses the abdominal walls around the uterus, *in situ*, making greater pressure from the patient's right toward her left side. This is to overcome the normal lateral torsion of the uterus; if it is not done, the uterine incision will be too near the left broad ligament, with considerably more hemorrhage.

The uterus is incised and the child delivered and treated as previously described.

As the head is being delivered, the assistant hooks his forefinger in the upper angle of the uterine wound, and pulls the uterus out of the abdomen, and then packs off with gauze behind and to either side.

The placenta and membranes are then delivered as previously described.

The uterine wound is closed exactly as in the previous operation, the uterus returned to the peritoneal cavity, and all clots sponged out.

The abdominal wound is closed and dressed as usual.

The ideal indication for the extraperitoneal Cæsarian section operation is the case which has been in labor for a considerable time, whose lower uterine segment is therefore well thinned out; who has been repeatedly examined; whose child is in good condition, but who is not obviously infected; one whose previous aseptic management is open to suspicion, but not one whose infection is a practical certainty.

It has certain disadvantages: (1) It is the most difficult, technically, of all the Cæsarians. (2) It is not to be attempted

before the patient is in labor, as the lower uterine segment is not thinned out. (3) Above all, it is not the operation for placenta previa; this because of the excessive bleeding.

These objections apply more or less to all the methods of extraperitoneal Cæsarian, but particularly to the one whose technique is here described.

The patient's abdomen and vaginal canal are prepared as previously described, and the doses of ergot and pituitrin given.

A central incision is made, from 2 inches below the umbilicus to the symphysis.

The peritoneum of the lower uterine segment is split in the middle line and dissected down behind the bladder.

The parietal and visceral layers of peritoneum are then clamped or sewed together. The former is quicker, easier, and satisfactory. This leaves an oval space of raw uterine muscle exposed.

A broad-bladed retractor is then placed behind the bladder in the lower angle of the wound.

The lower uterine segment is opened in the middle line, and the child's head delivered through the wound, with forceps. During the delivery of the head the retractor is removed, as its presence increases the risk of a tear of the bladder. A breech presentation makes this step of the operation considerably easier.

The child is treated as in the previous operations.

The placenta is extracted manually, with its membranes.

The wound in the lower uterine segment is then closed with a two-tier continuous stitch No. 2 chromic catgut. This stitch is a little more difficult of insertion than in the previous operations, but the difficulty is fairly easy to overcome.

The hemostats or stitches holding the two layers of peritoneum together are removed, and the peritoneum of the lower uterine segment sewed back where it belongs, over the uterine wound. No. 2 chromic gut is used.

The peritoneum is cleansed, and the abdominal wound closed as usual.

Due to the suture line in the lower uterine segment, which prevents it from collapsing as it does after normal labor, the fundus for a few days after labor is held up rather high. This is only for a short time, and the rate of involution proceeds normally thereafter. The uterine and abdominal wounds coincide for a small part of their extent only, and adhesions are unlikely.

During the whole operation none of the abdominal organs except the uterus are visible, and the smoothness of the convalescence of these cases will surprise one who sees it for the first time. It is like that of a normal labor case. The field of the operation is limited, but in its field it is a very useful procedure.

The bleeding during the operation is usually no more than after a normal labor. If it seems excessive, it should be remembered that the greatest possible irritation of the uterine muscle is the insertion of the necessary sutures. The suturing should therefore be begun without delay. In emergency, the bleeding can be controlled by compression of the broad ligaments, but this is rarely needed.

Postpartum hemorrhage is not greatly to be feared; the only cases in the series on which these conclusions are based were three in which no hypodermics or ergot were used. In all three of these the bleeding was controlled by uterine packing. Hirst does not hesitate to pack or irrigate a uterus sewed up as described.

Infection is the most serious complication, as it nearly always takes the form of peritonitis. The danger can be minimized by careful selection of the type of operation performed, and should peritonitis develop, the Fowler position, stimulation, and drainage are our only means of combating it.

It is not uncommon to see considerable abdominal distention after a Cæsarian section. Peristalsis is active, but the condition requires energetic treatment, not so much on account of any danger, but of the extreme discomfort: Hypodermic of eserine salicylate gr. 1/40, strychnine sulph. gr. 1/30 every four hours; hypodermic of ½ ampoule of pituitrin twice daily; high

enema of alum oz. 1 to the quart; the rectal tube left in place several hours at a time; and, if there is much gastric tympany, lavage. This routine will correct the trouble within forty-eight hours as a rule.

Especially in primiparæ there may be a rise of temperature to 102° or over about the fourth or fifth day, accompanied by some foul odor to the lochia. This is due to a lack of vaginal drainage, and usually not to any retention of clots in the uterus. A daily vaginal douche of sterile water is all that is required. Hirst states that he would not hesitate to irrigate the uterus in these cases, if it should be required, but it is very rarely necessary.

Stimulation is given, when needed, by hypodermics of digitalin gr. 1/10, strychnine sulph. gr. 1/20, camphorated oil in emergencies, but not intravenous injection of salt solution unless the need for stimulation has been caused by loss of blood. Simple postoperative shock will react better without the intravenous.

In cases of elective operation, the abdominal skin is as carefully prepared as for any other section. Most of the cases are emergencies, however, and a satisfactory skin preparation is to thoroughly shave, and then cover the abdominal skin with a thick poultice of tincture of green soap, held on by a binder. This is left on until the patient is on the table, then removed, and the skin further cleansed with alcohol and covered with rubber dam, through which latter the skin incision is made. The dam answers the same purpose as the surgeon's gloves. If one skin is covered, why leave the other exposed?

The anesthetic should not be gas. Ether or chloroform is preferable. The gas is dangerous to the child. The operation can be done under local anesthesia, but this is undesirable. So little time is needed for the operation that the short anesthetic period is without risk.

It is always advisable to have a trained assistant to conduct the revival of the baby. These babies often show the effects of the anesthetic to the mother and require considerable attention. Particularly is this

true when previous attempts at delivery have been made, with extra periods of anesthesia and possible injury to the child. It is common to see these babies born in asphyxia livida, and they require careful handling. The operation by no means guarantees safety for the child, when all these factors are taken into consideration.

The conclusions reached are based upon the writer's personal experience of 118 operations with three maternal deaths, a mortality of 2.54 per cent. The series is consecutive and unselected, all done by one of the methods detailed above. One mother died of peritonitis, due to infection probably at the time of operation; one of peritonitis, due to premature absorption of catgut and leakage from the uterine wound; and one from hemorrhage, not uterine in origin, but from a ruptured varicose vein in the broad ligament. This was proven by reopening the wound after death. The author's records of the child mortality are unfortunately not complete. He has the records of fourteen, and it must be remembered that in many of these patients previous and often violent methods of delivery had been attempted. Cæsarian section done as a last resort after attempts at delivery will always be attended by a fairly high fetal mortality, but for the mother is infinitely better than violent delivery not only in its immediate dangers, but in its effect upon the mother's future health.

A STUDY OF THE MENOPAUSE.

CULBERTSON (*Surgery, Gynecology and Obstetrics*, December, 1916) concludes his article as follows:

The menopause is a functional derangement on the part of various glands of the endocrine system subsequent to the cessation of the ovarian secretion.

On this basis may be explained the psychic and somatic manifestations of the menopause.

The vasomotor disturbances represent an instability of arterial tension.

In the majority of cases this takes the form of a vacillating hypertension, both systolic and diastolic.

The diastolic pressure is not elevated proportionately to the systolic. This produces an increased pulse-pressure.

Hot flushes, sweating, and other vasomotor symptoms are directly created by the vacillations in arterial tension.

In a minority of cases there is arterial hypotension, and here also the systolic and diastolic pressures are out of proportion.

Hypertension is apparently due to a relative oversufficiency on the part of the hypophysis or the adrenals.

The psychic symptoms are apparently influenced by thyroid dysfunction—in the majority of cases a hyperthyroidism, in the minority a hypothyroidism.

The administration of the missing hormone, represented by the extract of corpora lutea from animals in early gestation, brings about a gradual restoration to normal of the blood-pressure with disappearance of the mental symptoms.

This reduction of blood-pressure by organotherapy, together with the disproportionate systolic and diastolic rise, is offered as evidence that the hypertension is a functional one and not due to organic changes.

Blood-pressure estimation is essential, as a means both of measuring the degree of menopause disturbance and of controlling its therapy.

An occasional pressure reading is of little or no value. Tension must be determined at frequent intervals, preferably daily until improvement is well under way.

The significance of functional hypertension as a factor in uterine hemorrhage is obvious and will be made the subject of a subsequent report.

SOME PHASES OF EXPERIMENTAL SYPHILIS.

REASONER (*Journal of the American Medical Association*, Dec. 16, 1916) concludes an experiment on this subject as follows:

We have been able to demonstrate, to our satisfaction, fixed differences in various strains of syphilis as studied in the rabbit. In order to demonstrate these differences,

the use of adult rabbit and a standard and proper method of inoculation are necessary.

Choroiditis and chorioretinitis have been observed in rabbits inoculated with two different strains of nervous syphilis, and one strain whose characteristics are not known. In a series of fourteen other strains obtained from chancres and mucous lesions and studied with this end in view, such lesions were not observed.

Interstitial keratitis and pericorneal injection are frequent manifestations of generalization in some of various strains observed. In some it seems to be deeper and more permanent than in others. It is more readily induced by repeated intravenous injections following the testicular lesion, if performed within two months of the testicular lesion. The organisms may be demonstrated in the corneal scrapings. This is suggestive of a definite secondary stage.

Ordinarily the rabbit develops only an initial lesion, following inoculation in the genitalia, eyes, and eyebrows. Generalized syphilis without an initial lesion follows intravenous injections into various tissues and subcutaneous inoculations. This is suggested as having a possible bearing in the human disease. It would seem probable that the initial lesion, both in the human being and the rabbit, is an attempt at defense on the part of the individual, and that this power of reaction is possessed only in varying degree by certain tissues.

Reasoner is inclined to agree with Noguchi that the nervous tissue of the rabbit is resistant to syphilitic infection.

He was able to show that it was possible to produce nervous involvement in the rabbit without actual intracranial inoculation. He also succeeded in confirming Noguchi's sensitization experiments.

It was possible to demonstrate a generalized infection in rabbits from which the inoculated testicle had been removed before the initial lesion had fully developed. In one case the disease was transmitted by means of the blood serum of a rabbit, seventeen days before the initial lesion was palpable.

Nichols demonstrated that, in one strain at least, the removal of the inoculated tes-

ticle, as soon as the lesion was manifest, tended to favor the development of a lesion in the uninoculated testicle.

In his experiments, heating for five minutes at 50° C. killed the organisms. In a richly infected testicle kept at room temperature for fifty-six hours, it was possible to demonstrate slight rotary motion of the organism.

Two different strains were successfully inoculated into different testicles of the same rabbit on the same date. After a certain period superinoculations are difficult to produce.

The interpretation of the lesions and manifestations of strains of syphilis in the rabbit so as to increase our knowledge of human syphilis requires the coincident study of the same and similar strains in the human being.

He has seen in the rabbit a peculiar late testicular manifestation following repeated injections, intravenous and otherwise. It shows itself as a small nodule in the testicle, and contains many very slender and elongated organisms with normal forms. When transferred, the normal type of organism appears.

From eight injections of human spinal fluid, only two successful inoculations were obtained.

He has not been able to discover any morphologic differences in the various strains studied.

No permanent alteration in the characteristics of the strains has been observed following prolonged growth and repeated transfers in the rabbit.

Granting that there are strains or types of syphilis, differing in invasiveness or predilection for certain tissues, and having in mind more especially the nervous tissues, the individual resistance of the infected person must still be considered as a possible factor in the development of the disease.

A general anesthetic was employed in all operations or procedures which might be accompanied by serious pain or discomfort to the animal, and the few animals which developed a paralysis or other untoward manifestations were promptly and painlessly killed.

REVIEWS.

A MANUAL OF PHARMACOLOGY. By Torald Sollman, M.D. W. B. Saunders Company, Philadelphia, 1917. Price \$4.50.

All English-speaking pharmacologists are probably familiar, or ought to be familiar, with the earlier publications of Dr. Sollman. He has seen fit, with his publisher, not to consider this volume a later edition of his original text-book on pharmacology, but rather that it is a new work; since extensive revision of certain parts and exclusion of other parts has very materially changed the contents of the book. In order to keep the volume within bounds (at present it amounts to over nine hundred pages), he has separated the directions as to laboratory experiments and investigation and published them in a smaller companion volume. With the same object in view a large amount of the present volume is put in small type, the intention being that the facts stated in large type shall be considered the major ones, while those in the small type shall be considered of minor importance and only given consideration by those who wish more complete information along particular lines. Such a division of matter is by no means an easy task, and the practicing physician will, in a goodly number of cases, find that some of the facts which are most important to him are in the smaller type, or not mentioned at all, whereas the purely pharmacological facts are given *in extenso*. This is as it should be in a book which is entitled "A Manual of Pharmacology." A copious bibliographical index is added at the end of the volume, instead of at the end of each chapter, as in the earlier editions of the work.

It is impossible to take up *in extenso* all the characteristics of this noteworthy volume. Dr. Sollman has brought to its preparation a large amount of scientific knowledge and accurate observation from the laboratory standpoint, and has provided physicians with a mine from which they can continually take valuable information. He has not given as much credit or quoted as often from the earlier investigations by

American pharmacologists as he should have done, the vast majority of his references being to foreign literature over many decades, or to the work of Americans within the last five or ten years. Nothing is said about the work which was done by Horatio C. Wood and others, three or four decades ago, although some of these investigations were noteworthy, as, for example, the work of Wood and Reichert on the physiological action of the coal-tar products upon the heat mechanism, nor the investigations of these men upon chloroform and apomorphine.

The difficulty in classifying drugs has, as a rule, been well met, but in certain instances this difficulty is well illustrated. Thus, we find that under Fermentatives and Nutrients cod-liver oil is considered, but olive oil, lard, and similar animal fats are considered under Emollients, although they might be equally well considered under Nutrients, the more so as olive oil is often used by physicians to cause the patient to gain weight. We are also interested to note that ergot is not placed in any class, but immediately following it there is a class of drug classified as "Ecbolics" or "Oxytoxics." Surely ergot is essentially the oxytoxic, and, if a classification is to be adhered to, pituitary extract ought to be included under this heading, instead of being widely separated from it under a heading of its own.

There are a number of minor errors to which attention might be called, as, for example, the statement that a cup of tea or a cup of coffee contains an equal amount of caffeine; or that a cup of coffee contains the equivalent of one and a half grains. The U. S. government has shown that it contains about two and a quarter grains, and a cup of tea about one and a half grains. It is not clear why there should be an article on Anaphylaxis between Viburnum and the Nitrites. The statement that the action of the coal-tar antipyretics is such as to prevent the temperature from falling below the normal level is certainly not in accord with

clinical observation. So, too, we think that the statement that twenty grains of antipyrin is the average dose is erroneous, and that the advice that four or five doses are required per day to keep the patient practically fever-free will lead the physician into difficulties. Unless most of those who have employed hydrotherapy to a large extent in the treatment of fever are entirely in error, the observation made in regard to cold baths and the use of antipyretic drugs is not in accord with clinical experience, and the statement in italics that "the best general treatment of fever consists in a combination of antipyretics and graduated baths" will, if we mistake not, call forth a protest by that apostle of cold bathing, Dr. Simon Baruch. The object in using a cold bath is not to reduce the temperature but to eliminate poisons and stimulate protective processes, the return of temperature being a matter of comparatively little importance unless there is hyperpyrexia. The simultaneous use of coal-tar products prevents reaction and interferes with the benefits that the cold bath produces. The statement that quinine is absorbed mainly through the small intestine is also contradictory to the views commonly held by physicians, who generally believe that it is precipitated in the intestine, and that in urgent cases it is to be given in an acidulated solution in order to be promptly absorbed through the stomach.

These points are noted because in these respects the book will not serve as a practical guide to the clinician, but they would not be made were it not that the rest of the volume, in its pharmacologic aspect, is so great a credit to the author and to American medicine. One cannot peruse its pages without being impressed with the immense amount of literary research which the author must have carried out to bring together all the facts that he gives us. No pharmacologist can consider his library complete without this book. It is one to which we shall always turn when we desire information in regard to many fundamental facts in connection with the action of drugs as they have been determined in the laboratory.

A LABORATORY GUIDE IN PHARMACOLOGY. By Torald Sollman, M.D. W. B. Saunders Company, Philadelphia, 1917. Price \$2.50.

In calling attention to what is practically the new edition of Dr. Sollman's Text-book upon Pharmacology we noted the fact that, in order to add certain material to the main volume, he had abstracted therefrom a large amount of information in regard to laboratory exercises and methods of experimentation. This smaller volume, containing three hundred and fifty-five pages, is designed, as its title indicates, to introduce the student personally to some of the more important facts of pharmacology. In Part I Pharmacology and Toxicology exercises are confined strictly to the bare essentials which the author thinks are needed by the students who intend to become general practitioners of medicine. In Part II Experiments on Animals have been arranged in groups to illustrate the various types or phenomena and to bring out the similarity or difference in the response of organs to pharmaceutical agents rather than by individual drugs. Exercises are arranged for a course of thirty working periods of from two to three hours, but longer courses are also introduced.

Altogether the volume contains forty-six chapters, and to a certain extent duplicates some of the material which is found in the main volume, as, for example, the discussion of the treatment of poisoning and convulsants, the treatment of circulatory collapse, and in Chapter 46 the treatment of acute cardiac lesions. References are given in large number to technical papers to which the student may resort for collateral reading.

This volume, like the main one, reveals an immense amount of research in pharmacological literature, great familiarity with the technical portions of experimental pharmacology, and it is probably the best book in English to be obtained as a laboratory guide in the subject of which it treats. The type is large, the printing is well done, and the binding is of a quality to stand hard usage.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume 10. *Nervous and Mental Diseases*, Edited by Hugh T. Patrick, M.D., and Peter Bassoe, M.D. With the Collaboration of Lewis J. Pollock, M.D. Series 1916. Price \$1.35.

As our readers probably know, this series appears in ten small volumes a year dealing with the different branches of medicine, and, as indicated in the title, this is the tenth volume for the year 1916. It consists in abstracts from current medical literature by the chief editor and his assistants, and covers to a large extent the important neurological literature of the past twelve months. The influence of the European war upon the publication of neurological papers is well shown by the few references to foreign journals which the authors are able to make. Dr. Patrick is so well known to neurologists as one of the foremost men in his field that confidence may be felt in his separating the wheat from the tares in such a compilation.

THE MEDICAL CLINICS OF CHICAGO. January, 1917. Volume 2, No. 4. W. B. Saunders Company, Philadelphia, 1917.

We have so frequently called attention to the Medical Clinics of Chicago that there is little to be said in regard to their general intent and purpose. The present issue contains twelve clinics, by different hospital physicians in the city of Chicago, which are reports of what they said when giving bedside instructions in their various institutions. The book is well printed and illustrated whenever necessary.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume VII, *Obstetrics*. Edited by Joseph B. De Lee, A.M., M.D., with the Collaboration of Herbert M. Stowe, M.D. Series 1916. The Year Book Publishers, Chicago.

This book, representing a year's progress in Obstetrics, covers Pregnancy, Labor, Puerperium, the New Born, and Obstetrics in General. The selection of articles is excellently done, and the book is a most useful résumé of the more important literature.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

For the last twenty years we have been accustomed to look forward to mild winters. The last severe winter which we experienced was that of 1894-95, when for the greater part of the months January, February, and March the country was frozen, and skating was continuously possible. Since then, at all events in the southern part of the country, winters have been so mild that ice has not persisted for more than a few days. This year, however, we have had a spell of cold weather for three of the four weeks in January, and there is every prospect of it continuing. Very little snow has fallen, and there has been no occasion to scrape it from the pavements. The wind has been sufficient in most cases to clear it away without leaving any trace. A good fall of snow would be a considerable benefit, as

owing to the hard ground the birds are driven to picking the autumn-sown corn which has just come through the ground, and by this means do considerable damage to the prospective crops, so that the country folk are hoping for a fall of snow, whereas the town people are not particularly anxious for it.

We have again to report that cases are not being brought over, in large numbers from the military areas. I have had to deal with a few cases of trench foot, but these are very mild as compared with those of 1914, owing to the possibility of more careful observation at the front, so that none of them have shown any signs of gangrene. With six weeks in bed and other treatment they are able to get up and commence getting about. Six weeks seems to be about the minimum time for these cases to lose their pains and vascular symptoms. Beyond this type, the remainder of the cases seem to

be ordinary ailments, such as rheumatism, coughs, bronchitis, etc.

The scheme which I have frequently referred to for the treatment of venereal diseases came into force on January 1. It will, of course, be some time before the full advantages of the scheme are realized by the general public and by general practitioners, so that at the opening clinics there were not a great number of cases. The greatest rush is expected to take place with demobilization, and it looks as if the scheme will be some little time in operation before this eventuates.

Whispers are heard of another considerable call up of medical men, and the local committees are drawing up lists detailing the order in which different individuals ought to be summoned to the R. A. M. C. From conversations with men from different parts of the country, it appears to be the general opinion that a reorganization of staffs of the hospitals is practicable. In London the hospital staffs are dealt with through an Advisory Board constituted from the Royal Colleges of Physicians and Surgeons, and they have been busy going through their lists to see who can be spared. Possibly more organization could be carried out in London in the direction of the re-arrangement of work. We find that a surgeon may be attached to several smaller district hospitals which are widely separated from one another. The same surgeon may be attached, for instance, to a hospital in southwest London and to another in northeast London. By reorganizing the staffs of these hospitals it would certainly be possible to curtail the traveling incident to the present arrangement. This is especially desirable, as the difficulty of obtaining chauffeurs is increasing markedly. The government have been considerate with regard to the question of calling up chauffeurs, especially those of medical men, and every effort is being made to supply chauffeurs

from amongst those who are not fit for general service, and also from women who have obtained their certificates for motoring. The difficulty lies in the hours, for the substitutes are necessarily not so strong as the ordinary chauffeur, and cannot stand the increased work caused by night practice.

The difficulty alluded to above in supplying chauffeurs is voiced in the complaint of the Committee of the Metropolitan Asylums Board, who fear that in a short time they will be depleted of their drivers, and will be unable to send ambulances to remove infectious cases. Further, the removal of such a number of mechanics from the motor ambulance stations will prevent the necessary repairs to the motor vehicles from being carried out. A complaint has been made and laid before the Local Government Board and passed on to the military authorities. As a result an effort is to be made to obtain mechanics who are ineligible for military service. Early in this month 37 per cent of the ambulances used in these services were in need of repairs.

The recent explosion in an important munition works was felt at great distances. Houses were shaken and windows broken at a distance of at least six miles. In the open places the explosion was not felt. At the time it occurred I happened to be in Oxford Street. There was a sudden glow of reddish hue in the sky to the east, to which a second and more intense glow was added. Just as the second lighting up was dying away, the explosion was heard, and sounded very much like the firing of an anti-aircraft gun at a distance of a quarter of a mile. There was no alarm, and nobody seemed to appreciate what had happened, the general idea being that a cinema theater had caught fire somewhere much nearer to the center of the town than the site of the explosion.



NOTES AND QUERIES.

THE TIME FACTOR AND PREPAREDNESS.

The *Military Surgeon* for February, 1917, reminds us that General Forrest, of the Confederacy, epitomized the art of war in his saying that military success depended on "getting there first with the most men." He did not speak of "getting there some time, or any time"—he said "first."

All through the present war we have seen, over and over again, the truth of Forrest's saying borne out by results. Certain nations have been "getting there," but always too late to secure commensurate success. They have been tardily getting ready for military action at a time when the military situation demanded the action itself, and, therefore, have had to lose the tremendous military advantage of being able to take the offensive. Ultimately and belatedly they have gone through all the tremendous preparations necessary, shouldered the vastly increased cost of the same, and made an unduly bloody sacrifice of men and lives—all because the time factor had been previously overlooked, or disregarded, in their calculations. When they finally aroused to a realization of its vital importance, the critical period had passed by and the opponent, operating through a shorter time factor, had secured; and used to the fullest, the advantage of men and position.

The American people seem strangely to have overlooked the almost paramount value of time, in respect to the success of military operations. They have apparently learned nothing in this regard from the European war. They seemingly have not grasped the great truth, that initial success may be the deciding factor in the campaign or war, and that such initial success depends directly on the degree of preparedness. In other words, on ability to use a shorter time factor than the opponent—"to get there first with the most men."

They seem to treat time as a negligible quantity, and are prodigal of this factor, though it be recognized by all military men as of basic importance in war. They ap-

parently are willing to accept all the increased burdens and cost of delay, and to sacrifice armies in later securing positions of tactical advantage that, with preparedness, might have been occupied without resistance. Every conception of such military plan as is generally advanced seems to contemplate the beginning of training and preparation after hostilities are declared and blows are struck.

In all the newspaper comment on the war, the *Military Surgeon* has never noticed a single item referring to the time factor. Apparently the country assumes that, in some way or other, it will ultimately muddle through its difficulty. While proud of its potential resources, the nation blinds its eyes to the fact that these are not immediate military assets and assumes, without warrant, that the enemy will generously suspend military operations for the long time necessary to convert the former into the latter. As well might a peaceful citizen, assaulted by a footpad, expect immunity while he undergoes training in boxing, so that he may be able to defend himself.

This time concession and delay of hostilities are exactly what no intelligent and vigorous enemy would ever grant us. He would strike at once and strike hard, to paralyze at the outset the complex, cumbersome machinery of preparation we propose, tardily, to attempt to create and set in motion. He would wring every particle of advantage out of the time factor.

Had the call for the present mobilization come against a first-class power, the indemnity would doubtless have long since arrived at the foreign capital. Our latent resources, large though they may be, are no bulwark against the sudden, swift and mighty blows of modern warfare, any more than next year's crops would be of value in a present famine. This nation has no France, as England had, to raise a stone wall, behind which there is opportunity for the two years' intensive preparation demanded by modern war.

The Medical Department has not the

power to govern the general military policy of this country. But it sees, at least as clearly as any other branch of the service, the necessity for preparedness. Long in advance of the present mobilization on the border, it realized the value of the time factor. As a result there has been no complaint as to shortage of medical supplies, because they were procured and stored against the time of their need, and were ready when emergency required. It has contended, against opposition and inertia, for a personnel adequate to utilize its supplies in time of stress. It was training its medical reserve officers for years before any other branch of the service had such a supplementary force. It has been a leader in this, as in many other military affairs, and has set an example in forethought and preparation which has not been lost upon the rest of the army. So far as it is concerned, the emergency found it prepared to function in a quite satisfactorily short time factor.

But the success of the Medical Department, in its broader sense, cannot be dissociated from military success as a whole. This, for the future, depends upon preparedness, upon a short time factor, upon ability to "get there first with the most men."

There is absolutely no plan that will satisfy the nation's need in this respect other than that requiring universal military training. The issue cannot be evaded, and it is easy to see through the specious arguments created to becloud it. When any military emergency arises, it must find the men trained, the guns on hand, and the supplies in stock. To attempt to get along with less is for the nation to throw dice with destiny. The provision in advance of adequate military defence means that the rights of the country will not be assailed, and that it will mercifully be spared the necessity of utilizing the military agencies so provided.

There need be no fear of aggression by any other nation, if there is a world knowledge that we are the ones who, as a result of forethought based on common sense, will "get there first with the most men."

FEES OF YOUNG PRACTITIONERS.

In an action by a physician against an estate for services rendered the testatrix for some disease of the brain, the nature of which even a post-mortem examination did not clearly determine, it appeared that the plaintiff was a young physician who had been an old friend of testatrix. The trial judge allowed the claim of \$1500 only to the extent of \$262, being of opinion that a young practitioner has no right to charge, or expect to be paid, the fees charged by those who are older and whose reputations have been established. On appeal, the Louisiana Supreme Court said that it may happen that the knowledge of the schools goes beyond that upon which reputations have been founded, and that the latest graduate, bringing, with his diploma, the latest discoveries, is more competent to deal with a particular case than the earlier, with the experience of a past generation. However that may be, the court held that any physician has the right, in the absence of a custom of his own, to charge for his visits, day or night, at least the fee sanctioned by the custom of the community in which he lives; nor is he obliged, in so doing, to rate himself below the class to which, in his opinion, he properly belongs; and in such a case the burden rests upon the patient who refuses to pay to show a better reason for such refusal than that the physician is comparatively fresh from the seats of learning. The amount to be allowed was increased to \$1500, the amount claimed.—*Succession of Percival (La.)*, 72 So., 467.—*Medical Record*, Nov. 25, 1916.



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ORIGINAL COMMUNICATIONS.

A THERAPEUTIC CONTRIBUTION TO THE SUBJECT OF THE MIGRAINES.

BY TOM A. WILLIAMS, M.B., C.M. EDIN., WASHINGTON, D. C.,

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In following the history of migrainous individuals, the frequency of vascular disease in after life is conspicuous. Not only is this so when the headaches are of the classical variety, paroxysmal, unilateral, with nausea and vomiting and often scotoma; but when headaches are more dull, longer continued; or without nausea and vomiting or scotoma. Furthermore, therapeutics which has proved so successful in cases of chronic dull headache is equally efficacious in recurrent hemicrania.

Furthermore, the measures employed are similar to those beneficial in the forms of vascular disease (see Antecedents of High Blood-pressure and Nervousness, Monthly Cyclopedica, 1911) which are so apt to follow long-standing recurrent headache.

As *curationes naturam morborum ostendunt*, a common pathogenesis should be sought for in these conditions. This contribution is an attempt to gather certain clinical facts in that direction, although the proof requires further considerable data to be gained only in the laboratory. The nature of these will be more appreciable when the clinical facts are perused.

To prevent undue length, no considerations concerning differential diagnosis have been mentioned, nor in each case have the details been completely furnished, nor has any tabulation of symptoms and treatment been attempted; for the object of the presentation is merely to draw attention to a mode of investigation of a disease which

was formerly regarded as inexplicable because hereditary, and before which therapeutics was supposed to be helpless. Regarding diagnosis, a warning is necessary that the symptoms of a long-standing headache due to organic cerebral changes can at first scarcely be differentiated from those due to chemical vices, until clinical signs of the former begin to show themselves. These remarks apply particularly to cases of serositis, more particularly when localized, and especially that due to interference with the calcium balance. In such headaches the treatment must be quite different from that advocated in this communication concerning migraine.

The improvement of the toxic form of headache which we are considering sometimes effected by treatment directed to the assimilative function is quite in consonance with the explanations now presented. For it is not the improvement of digestion *per se* which cures headaches, but the bettering of metabolism incidental to the new diet the patient is made to take. Another error regarding the pathogenesis of periodic headaches is to attribute them to the menstrual function itself, whereas menstruation is a disturber of metabolism in certain instances, and hence aggravates a toxicosis already latent. Even in some cases in which eye-strain may be incriminated the metabolic factor may be important, as in Dr. Wilmer's case in this paper.

The recurrent headaches due to endo-

crine disorders have not been considered here, although it is possible that the activators of metabolism furnished by internal secretions may play a considerable part in those dealt with. In some of the cases here described and in others not inserted, endocrine hormones have been given in the attempt to better metabolism; but the material is insufficient to furnish a conclusion in so complicated a matter.

The cases which follow are presented in order to illustrate the relationship between migraine proper and chronic toxic headache. They are divided into three types: first, headache whether migrainous or not, accompanied by increased vascular tension; second, cases of classical migraine; third, cases of chronic headache without migrainous features.

CASES WITH INCREASED VASCULAR TENSION.

Case 1.—Recurrent headache since childhood. A woman of forty-eight was referred in March, 1915, by Dr. Howard Kelly, Baltimore, because of headache and insomnia. The former had occurred since childhood, but for eight months had been very severe and almost weekly in occurrence. It commenced at night and always lasted until sleep, and sometimes for two days. Nothing relieved it. There was no nausea, scotoma, or vomiting, although usually slight constipation. She slept only about four hours a night, being wakeful and sleep always ceasing very early in the morning. The feet would be cold and the body perspiring, hot and cold alternately. Albolene for six weeks had not relieved the headaches. Although the digestion had been incriminated and she had eaten no fried food or pastry, and had latterly given up milk, custard, and sweets, no relief had been obtained. She was a very strong, active woman, but adipose.

Examination: The reflexes were overactive, the fat slightly hyperesthetic; the blood-pressure was 175, diastolic 125, the vessel walls soft. At the base of the optic papilla there was slight indistinctness, but no bulging.

The urine was normal, and there was no

extra micturition in the nights except during headache attacks, after which diuresis was very copious.

Under appropriate treatment the blood-pressure fell by stages to 150-105, 145-95, 138-98, 140-90, 126-88, with only one headache in eighteen days. Four weeks after I saw her, however, there was one very violent headache, with a blood-pressure of 150-108. Two days later a slight blurring of the disk occurred.

In June there was one slight headache, and she awoke with one very severe one, which was stopped by sweating and massage at 2 P.M. Ten days after this the blood-pressure was 130-90, and while standing up 124-78. The rest of the summer continued without headache; but one occurred in November after a fall. The blood-pressure at that time was 145-90 and 150-100 on different occasions. She had, however, ceased taking cereal for fear of adiposity, and had ceased milk also. This was rectified, and since then I understand from Dr. Kaufman, the patient's physician, that she remains comfortable and free of headache.

Case 2.—Simple matutinal headache; eye-strain. A woman aged forty-three was referred by Dr. Wilmer because of morning headaches since the age of twenty-five, for which an ocular muscle unbalance was in his opinion not entirely accountable. On account of her feeling that she could not control herself and of the melancholy induced thereby, Dr. Wilmer believed that neurological treatment might prepare the patient for a tendon advancement, which he was unwilling to undertake otherwise, as two previous tenotomies at different hands had failed to relieve the headaches.

Examination showed no organic defects; but a blood-pressure of 158-112, which, on standing up, did not rise. There was no constipation; but she had greatly restricted the carbohydrates for a year and had thus reduced her weight from 225 to 170 pounds.

I considered it desirable to have the kidney function tested, and Dr. Hagner reported 50 per cent return of phenolsulphone-phthalein in forty minutes.

In the meantime she was given standard

low protein diet, baths, and massage, and advised to occupy herself as much as possible. In six days the blood-pressure had fallen to 136-90, standing 120-86, although lying down it was 150-100.

Headache still persisted, and she felt tired all the time. In two weeks the blood-pressure was 132-89 while in hospital preparing for operation. This was successfully performed; she made a good convalescence, and in a few weeks was quite comfortable and free from headache. The increase of weight by the badly balanced diet was later met by diminution of fat and cereals without detriment to the general health.

Case 3.—Migraine followed by arteriosclerosis. A woman of fifty-seven was referred by Surgeon-General Blue, March, 1916, because of dizziness, general nervousness, and pains in the leg which interfered with sleep. She had formerly had migrainous headaches, but these had diminished for some years. There were no neurological signs, but the blood-pressure was 220-143, standing 215-150, and the left dorsalis pedis and the right posterior tibial arteries were markedly sclerosed. The pulse-rate would rise to 120 at times; it was usually about 90. The nose bled at times.

The patient was given appropriate diet and baths; but soon had to return home because of her daughter's illness. The case is given as an illustration of the well-known disappearance of periodic headaches in certain persons as age advances, and to illustrate the frequent relationship of this with high arterial tension, and in order that these observations may be compared with the fact that many cases of high arterial tension without headache are frequently modified by the mode of treatment which benefits the headache.

CASES OF TYPICAL MIGRAINE.

The first of these cases showed also arterial hypertension; but both regarding heredity and the nature of the headaches it was typical hemicrania.

Case 4.—Classical migraine illustrating successful therapeutics. A physician, aged thirty-eight, consulted me in April, 1915,

for a periodic headache since boyhood, a true migraine, increasing as he grew older. All his brothers and sisters and his father were affected, and there were migrainous headaches on the other side of the family also.

The attack is classical, beginning usually on the right temple, extending quickly to the occiput. Glasses improved him slightly while in the medical school, when his astigmatism aggravated the headaches. They used to come every two or three months, but for six years past have been increasing in frequency and intensity, although they may be postponed for a day by aspirin.

Other important negative facts are incipient tuberculosis after graduation, a frontal sinus infection while treating this in the southwest, an estivo-autumnal fever since 1905, ptomaine poisoning in 1910, since which he has had a feeling of severe *malaise* relieved by diarrhea about every two weeks. A gastroenterologist thought a gastric ulcer with pyloric stenosis was the cause of this, and explained in this way a gastric hyperacidity. After his treatment the diarrhea was less frequent, but the headaches became still worse, and neuralgia every four days made life almost intolerable, as he had been only free for two weeks the whole winter. Alcohol would always provoke a headache the next day.

Examination showed overactive reflexes, small but active pupils, and clean tongue. Blood-pressure 153, with 98 diastolic.

Treatment: The patient was treated appropriately. Six weeks later he wrote me: "I want to take this opportunity to express to you in part my great appreciation of what you have done for me in curing me of my headaches. It is like living in another world to be free from them. I am able to eat all the green vegetables and fruit now, something I have not been able to do for several years. To be free from those terrible head pains is like a dream to me, almost too good to be true." A year later he remains well.

Case 5.—Migraine developing into cervical neuralgia. A physician's wife, aged forty, had had severe migraine headaches

increasing in frequency since about the age of twenty. Latterly they had become so much worse that she had been induced to consult me, because of a neuralgic disturbance in the neck and shoulders, in the belief that this could be relieved, although she had been most skeptical as to any possibility of relief from the headaches when spoken to concerning them some years before, when she had refused to consult me.

Examination showed no abnormalities nor increase of blood-pressure, although she was of a very tense, nervous temperament. Her diet, however, which she believed to be very simple and without connection with her illness, was as follows:

Breakfast: Cereal, 2 eggs, muffins, coffee, no fruit.

Cocoa occasionally at eleven o'clock.

Luncheon: Hearty dinner; no sweets, no tea; may eat an apple; water.

Dinner: Meat and vegetables; sweets rarely; water.

Fruit between meals rarely.

She was prescribed treatment similar to the other cases; and the result was that in spite of considerable occasional imprudence in diet and an excessive expenditure of nervous energy, she is sometimes free from headaches for months, rarely has them severely, and is now able to perform her exacting social duties and indulge her musical tastes better than she has ever before done, in spite of chronic appendicitis and several severe attacks of grippe during the last three years.

Case 6.—Intense and increasing headaches with neural involvement and tachycardia. A woman, aged forty, was referred by Dr. Wynkoop in May, 1912, because of intensely severe recurrent headaches since the age of eleven. At first they had only lasted a few hours, but for some years they would last for three days intensely, and less so for two days longer. They were preceded by scotoma, characterized by throbbing, accompanied by great nervousness, exhaustion, sensation of hard beating of the pulse, pain all over the body. They generally were associated with menstruation. Her father and brother have similar headaches.

She has frequently albuminuria, and during gestation the urine showed 40 per cent of albumin.

Examination showed active reflexes, blood-pressure 162, diastolic 110; pulse-rate 120; slight cardiac dilatation, apex being in the sixth interspace and right border one inch outside of sternum. The reflexes were very active. There was some tremor, but not of a toxic type, and the Quinquaud sign was absent. Believing that high blood-pressure and tachycardia might be due to nervous excitement on account of examination, I saw her again the following day and found the blood-pressure 136 and the pulse 90, tremor absent. Observations taken at home showed:

Pulse—Saturday, 6 A.M., asleep, in bed, 72; 6 P.M., resting after 50-yard slow walk, 112 to 100; 10 P.M., resting, going to bed, 90. Sunday, 6 A.M., asleep in bed, 70 to 72; 10 A.M., reading—quiet all morning, 92; 12.30 P.M., light housework, 108.

The hemoglobin content was normal; constipation was troublesome, as she had had it for years, and always took cascarn or enemata. The digestion was heavy, with acidity, and she slept after meals. The diet was as follows:

Breakfast: Cereal, bread, strong coffee, rarely an egg.

Lunch: Weak tea, bread, cold meat, cooked fruit.

Dinner: Abundant because she was always very hungry then—about two ounces of meat and strong coffee taken.

Treatment: She was told to limit the amount of protein in the diet, but above all to increase the succulent and saline content, and that her dread of acidity because of carbohydrates and sweet foods was groundless. These measures she carried out; and although on account of other considerations I did not see her again, the headaches became far less frequent and less intense.

ATYPICAL MIGRAINE OR DIFFUSE RECURRENT HEADACHES.

Case 7.—Migraine resembling petit mal, due to metabolic disorder. A bacteriologist, aged thirty, was referred in the spring of

1912 by Dr. Paul Johnston because of attacks he calls "bilious" (but not accompanied nor preceded by constipation), which produce headache, preceded by numbness and pricking in the fingers, followed by dizziness, mental confusion, and foolish talk of paraphasic type, without loss of consciousness. These attacks have occurred every two or three months since the age of twenty-two; they are of very short duration. There were no scotomata, but they were formerly accompanied by vomiting. The headache is of the splitting kind, lasts all day, and is followed by dulness and slowness of thought the day following. The capacity to concentrate his thoughts is increasingly impaired even between the attacks. He is at times irritable. He has no bad habits, and apart from these attacks he is well and strong.

He received a blow on the left side of the head as a boy, and there is still a dent in the left parietal region, upon which side the headache more often occurs. He has a large appetite, which he says he controls, but he eats meat thrice a day, although he says sparingly; takes no alcohol. The blood-pressure is not raised, the reflexes and sensibility are normal.

Treatment: He was given the low protein "standard" diet. He wrote me the following winter: "Since I have increased the quantity of vegetables I have had no recurrence of those spells." Dr. Johnston informs me that he remained well to date—years later.

The clinical relationship of migraine to epilepsy has been emphasized strongly by Gowers, who has collected a number of cases in which one of these manifestations seems to be convertible with the other. To discuss this problem would lead too far for the object of this paper. However, a treatment similar to that employed by me for migraine has been successful in certain types of epilepsy in young persons. (See *Review of Neurology and Psychiatry*, March, 1915; also *Interstate Medical Journal*, April, 1915.)

PATHOGENESIS.

The pathogenesis of this variety of headache must be noticed in all cases described in this paper. (I have many others which for lack of space are not inserted.) The dietetic balance has always been disproportionate in respect to an insufficiency of carbohydrates in relation to caloric need. In consequence there has been consumed what for the individual in question is an excess of protein. Now it must be remembered that the alkaline potentiality of the tissues is insufficient to permit of an exclusively protein diet. When full caloric need is satisfied, there will remain 25 per cent of protein intake unutilizable because of lack of alkali. This is converted into ammonium carbonate, which is disposed of in the urine in the carnivorous animals by conversion into other nitrogen compounds (Fisher). Now most individuals can dispose of an excessive amount of nitrogen by such conversions; but when hepatic or renal sufficiency is impaired this cannot be done. The accumulation of unexcreted protein produces tissue acidosis; acidosis in turn causes hydrolysis, that is edema, which produces swelling. The actual occurrence of cerebral edema in migraine is undemonstrated; but we know of no reason against its occurrence. If it is so, the meningeal capsule must be stretched, dragged upon, and such dragging is supposed to be the only source of pain inside the cranium.

The Question of Lateralization.—If this be the correct interpretation, we have still to ask why a general toxic state and edema caused by hyperproteosis manifests itself unilaterally as in the classical hemicrania. This question is not insuperable, for the lateralization of edema even in the periphery often occurs, in consequence of vascular and neural irregularities, posture, tissue asymmetry, and topographical peculiarities. In addition to these factors, we have those of right- and left-handedness, absence of bilaterality in the innominate artery and vein, in the portal and hemorrhoidal circulation, in the stomach and liver. We have

also the different course of the right and left vagus and the difference of topography of the right and left lung, as well as the asymmetrical posture due to one's position in writing.

These lateralizing factors may, however, be entirely outweighed by the general ones. In the latter case, we have bilateral or diffuse headache; in the former, hemicrania. Lateralization, however, may be determined by the factors which induce referred pains, such as unilateral inflammatory affection of viscera or other tissue.

The kind of protein seems to be of importance in cases of arterial hypertension (Eustis). Whether it be so in migraine has yet to be ascertained. By kind of protein we mean the relative amount of the different amino-acids furnished by its splitting up.

There are other problems to work out regarding the metabolism in migrainous individuals. There are obstacles to this in the case of private patients, which is all my position permits me to deal with at present. Such questions are the relation of the migraine attack to the amount of non-protein nitrogen in the blood; the relation of the attack to fluctuation in renal and hepatic sufficiency; the relation of the attack to variations in cardiac potency; the relation of the attack to the vago-tonic or sympathetic-tonic states.

Valuable information will be derived from the elucidation of these questions—for instance, the headache which sometimes occurs in the early stages of frontal tumors has clinical resemblance to the diffuse toxic headache, and for a while may be relieved by similar measures, because perhaps of the aggravation of intracranial hypertension by a slight toxicity, the removal of which abrogates for a while the tension headache, thus leading to an error in prognosis.

THE PRINCIPLES OF THE TREATMENT.

The important point to bear in mind is that a hyperaminoacidosis occurs in every individual as soon as the protein intake exceeds the alkaline valence of the tissues. Although the manifestations of this are vari-

ous, we are considering only that of headache.

The object, however, is not only to diminish the protein intake, but to improve the metabolic capacity. In this there are two important other principles concerned.

The first principle of treatment is to aim at adequate combustion. This is to be secured only by a sufficiency of carbohydrates and fats, more particularly the former. For when the protein balance has been impaired, acidosis is imminent, and lack of alkalinity interferes with the due saponification of fats. Besides which, the fats make a large demand upon the alkaline juices while being emulsified, and they are difficult to oxidize afterwards; whereas the carbohydrates are exceedingly labile and are indeed only with difficulty stored up by means of the pancreatic hormone balancing the lytic hormones of the adrenal and pituitary glands still further activated by the juice of the thyroid. Here the absence of the utilization of the carbohydrates eventuates in the acidosis found in diabetes. Another fact showing the importance of the carbohydrates is that an experimental aminolytic edema of a limb can be immediately cleared up by the intravenous injection of glucose, even when alkali entirely fails to influence it (Fisher).

The second principle of treatment is the furtherance of the saline tissue-exchange. By this is meant the facilitation of metabolism secured by the ingestion of the salts of the alkalies. Schmiedeberg (*The Principles of Pharmacology*) showed twenty years ago how the excretion of water was favored by these, more especially when sodium and potassium were played against each other separately.

Numerous experiments since have shown how the alkalies thus favored the labilization of nerve tissue, while the alkaline earths favor stabilization.

The practical method for securing these three needs is:

First: Limit the protein to a maximum of 50 grammes per day, which Chittenden has found to be an adequate standard for body maintenance.

Second: Maintain caloric need by suffi-

ciency of carbohydrate to the amount of about three or four times dry-weight greater than the protein intake.

Third: Supplement this by a moderate amount of fat.

Fourth: Give sufficiency of salines in the form of fruits and vegetables.

Complementary Measures.—In addition to these essentials, many subsidiary measures may have to be utilized in accordance with the individual's peculiarities or in relation to other symptoms. Thus, constipation must be prevented because of the consequent absorption of proteins particularly poisonous to the tissues. This must not be done by the drastic measure of purgation

by neuromuscular poisons or by hydragogue cathartics, but by supplementing a model diet which already has a tendency to prevent constipation by an increase of cellulose, of fiber, of saline constituents, and perhaps by oil. Sometimes enemata are required, and in a few cases ox bile is essential. In certain cases hypometabolism will not be quickened by these measures. This is usually because of the lack of necessary hormones. In these patients that of the thyroid in particular may be of value.

Thus the migraines are no exception to the therapeutic rule that each case must be considered in full detail, and that no routine treatment can promise success.

THE REPORT OF THE DEPARTMENT OF RADIUM THERAPY AT JEFFERSON COLLEGE HOSPITAL.

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Since the establishment at Jefferson College of the Department of Radium Therapy, made possible by the establishment of the "Lucy B. Henderson Foundation," its energy has been devoted entirely to the field of radiology. During this last year, under great difficulties, owing to the present condition of obtaining both material and suitable skilled labor, the necessary apparatus has been installed for the separation of the "emanation" and "active deposit," and it is expected that this will lead both to a broadening of the field of usefulness, and to the greater employment of radium in internal medicine.

While a diversity of opinion exists as to the usefulness of radium in medicine, it must be admitted that in a limited field it has accomplished results which cannot be duplicated by any other known agent. Just why these results are produced, while in other instances almost parallel radium fails, cannot be answered, and therefore further careful study is needed in the hope that with the refinement of technique certain

conditions now not under control will likewise respond.

In the last two years 133 cases have been treated, with more or less improvement in 47, as is shown by the following table:

CLASSIFICATION OF DISEASES.

Angiomata:	
Arm and breast.....	1
Face	4
Face and neck.....	3
Lip	1
Upper lip	1
Tongue	1
Cavernous	3
Scalp	1
Mole	3
Nevus:	
Nose	1
Face	1
Angiopapilloma, mouth..	1
Carcinoma	59
Cheilitis	1
Cystadenoma rectum....	1
Endothelioma	1
Epithelioma	14
Fibroid	5
Goitre	1
Gumma	3
Keratoses nose	1
Leukoplakia	1
Liver (enlarged)	1
Papilloma:	
Larynx	1
Mouth	1
Rhinoscleroma	1
Rodent ulcer	1
Sarcoma	14
Sinus	1
Splenomegaly	1
Tinnitus aurium	1
Tuberculous glands....	1
Tuberculous sinus.....	1
Tuberculous prostate....	1
Ulcer:	
Eye	1
Lip	1
Undiagnosed	1

In this table no attempt has been made to show the result of treatment, as this and other details will be given in the following table:

CASES TREATED—DIAGNOSIS AND RESULTS.

No.	Date.	Name.	Referred by:	Age.	M. or F.	S. or W.	Diagnosis.	Treatment.	Result.	Remarks.
1	12/2/14	M. J. K.	Dr. W. D. Robinson.	61	F.	M.	Carcinoma of pelvis.	Radium, followed by x-ray.	Much improved.	See notes.
2	12/14/14	J. P. D.	Dr. Bland.	55	M.	M.	Epithelioma of floor of mouth.	56 treatments, 9855 mg. hrs.	Negative.	Sent to Oncologic Hospital for treatment.
3	12/20/14	P. D.	Dr. F. T. Stewart.	38	M.	S.	Sarcoma of buttock.	Radium to vaginal ulcer.	Size of tumor decreased.	Died.
4	1/6/15	A. G.	Dr. Bland.	38	F.	M.	Carcinoma of cervix.	Radium to vaginal ulcer.	Improved.	Case became operable and hysterectomy was performed.
5	1/8/15	W. D.	.....	70	M.	M.	Carcinoma of hard and soft palate.	.....	Negative.	Discontinued treatment 2/17/15. Died 7/10/15.
6	1/19/15	J. E. C.	Dr. Brittingham.	72	M.	W.	Carcinoma of tongue.	Radium to ulcer.	Negative.	No recurrence December, 1916.
7	1/12/15	XXX	Dr. J. Chalmers DaCosta.	45	M.	M.	Papilloma of mucous membrane of mouth.	Radium to rectum, perineum, and suprapubic.	W. M. E. D.	After treated in another institution, and is still in fair health.
8	1/16/15	XXX	Dr. Weisenberg.	68	M.	M.	Prostatic carcinoma.	Radium.	Improved.	Patient received one treatment and decided not to return. No history taken.
9	1/17/15	M. M.	Dr. L. Solis Cohen.	71	F.	S.	Goitre.	Radium, xx mg., to body of uterus.	Much improved.	See notes. Examined Jan. 11, 1917. W. M. E. D.
10	1/18/15	L. DeH.	Dr. Peterson.	57	F.	S.	Adenocarcinoma of uterus.	759 mg. hrs.; 23 treatments.	Much improved.	Patient very fat. Operation for removal of remains of tumor Nov., 1916.
11	1/20/15	J. V. C.	Skin O. P. D.	1	M.	S.	Angioma lower eyelid, cavernous.	Radium to body of uterus.	Bleeding checked; tumor became smaller.	Failed to continue treatment.
12	1/28/15	E. W.	.....	42	F.	W.	Fibroid, uterine.	Radium applied to mass.	Negative.	Wassermann positive.
13	2/6/15	A. A.	Dr. J. B. Deaver.	38	M.	M.	Carcinoma of rectum.	Radium applied externally.	Negative.	See notes.
14	2/6/15	O. D.	Dr. DaCosta.	35	M.	S.	Epithelioma of cheek.	Special report.	Improved.	Patient in good health Dec., 1916. Dr. J. B. Deaver, referred for radium.
15	2/8/15	XXX	Dr. Watson.	71	M.	M.	Carcinoma of larynx.	Radium to mass.	Negative.	Radium applied to ex. aud. meatus
16	2/11/15	M. B.	Dr. Joseph Sailer.	68	M.	M.	Round-cell sarcoma of palate.	Radium to ulcer.	Improved.	Has had a recurrence Jan., 1917.
17	2/11/15	J. B. L.	Dr. W. D. Robinson.	39	M.	M.	Spilonogely.	17 treatments, 561 mg. hrs.	Improved.	Result very good. See illustration.
18	2/11/15	J. R. B.	.....	81	M.	W.	Carcinoma of jaw.	18 treatments given daily.	W. M. E. D.	Operated on 4/9/15. Died 4/15/15.
19	2/24/15	N. B. Y.	Ear O. P. D.	62	M.	M.	Tinnitus aurium.	1204 mg. hrs.	Negative.	.....
20	2/25/15	E. M.	Dr. DaCosta.	47	F.	S.	Papilloma floor of mouth.	5 treatments, 600 mg. hrs.	Negative.	.....
21	3/1/15	H. F.	Child O. P. D.	10 mo.	F.	S.	Nervous of nose.	Postoperative.	No improvement.	.....
22	3/6/15	W. L.	Dr. DaCosta.	34	M.	M.	Carcinoma of jaw.	17 treatments, 984 mg. hrs.	Negative.	.....
23	3/6/15	M. O. D.	Dr. Reynolds.	81	M.	W.	Epithelioma of cheek.	9 treatments, 1080 mg. hrs.	Negative.	.....
24	3/7/15	C. H.	Dr. Montgomery.	38	F.	S.	Recurrent carcinoma of testes.	Under treatment	Left.	Other methods tried and failed.
25	3/21/15	J. H.	Dr. Nassau.	37	M.	M.	Endothelioma of brain.	.....	.....	Impossible to give value of treatments. Referred to Oncologic Hospital.
26	3/10/15	E. P.	Dr. Lytle.	10	F.	S.	Angioma of left hand and arm.	.....	.....	.....
27	4/10/15	P. M.	Dr. Stewart.	47	M.	S.	T. B. glands of neck.	.....	.....	.....
28	3/18/15	O. M.	O. P. D.	32	F.	S.	Carcinoma of vagina.	.....	.....	.....
29	4/22/15	L. G.	Dr. Strouse.	3 1/2	F.	S.	Nervus of face.	.....	.....	.....
30	4/26/15	F. W.	Skin Department.	4 mo.	M.	S.	Venous angioma of face and neck.	.....	.....	.....
31	.....	M. S.	Dr. Schanberg.	31	F.	S.	Recurrent sarcoma of shoulder.	Radium.	Negative.	.....
32	4/12/15	A. R.	Dr. Stewart.	44	F.	S.	Recurrent carcinoma in pelvis.	7 treatments, 1688 mg. hrs.	Died 9/17/15.	Still under treatment, and illustrations.
33	5/10/15	A. R.	Dr. Fussell.	54	F.	M.	Angioma of face.	Radium to the surface.	W. M. E. D.	See notes.
34	6/3/15	W. J. E.	Dr. Reeves.	62	M.	M.	Chronic ulcer of left upper eyelid. (Epithelioma.)	.....	.....	See notes.
35	6/7/15	S. H. D.	.....	60	M.	M.	Keratosis of nose.	Treated from June 12 to 26.	W. M. E. D.	.....
36	6/7/15	H. S.	Dr. Boryell.	2	M.	S.	Gliosis of orbit.	3560 mg. hrs.	Negative.	.....
37	6/23/15	J. F.	Dr. Stiles.	63	F.	M.	Papilloma of larynx.	Radium applied externally.	Negative.	For a time gave relief from pain.
38	6/23/15	H. P.	Dr. Shallow.	1	F.	S.	Hemangioma of scalp.	Radium to the mass.	Good.	See notes.
39	.....	E. D.	Dr. Francis Murphy.	4 mo.	F.	S.	Hemangioma and malnutrition.	.....	Died.	Hospital case.
40	6/23/15	E. P.	Dr. Graham, C. W.	46	F.	S.	Sarcoma of pelvis.	Radium to vaginal ulcer x-ray to abdomen.	Improved locally. Developed masses in upper abdomen, chest, etc.	Fibroid removed about a year ago.
41	5/11/15	Sr. M. St. L.	Dr. Henry Jump.	48	F.	S.	Fibroid of uterus.	Radium to uterus.	W. M. E. D.	See notes.

42	7/12/15	G. P.	Dr. McChary.	43	F. M.	S. M.	Fibroid of uterus.	Radium to uterus.	W. M. E. D.	See notes.
43	5/10/15	L. C.	Dr. Service.	44	F. M.	S. M.	Tumor of liver.	.....	Negative.	Did not continue treatment.
44	7/20/15	L. C.	Dr. E. M. Richter.	45	F. M.	S. M.	Carcinoma of cervix.	.....	Negative.	Did not continue treatment.
45	7/20/15	W. C.	Dr. J. W. Martin.	46	M. M.	S. M.	Angioma of face.	.....	Negative.	Did not continue treatment.
46	7/28/15	G. D. P.	Dr. Smith.	47	M. M.	S. M.	Epithelioma of cheek.	Radium to right side of face.	Negative.	Illustration, see notes. Had a troublesome general sepsis after treatment.
47	8/19/15	R. C.	Dr. Despard.	48	M. M.	S. M.	Hairy mole of cheek.	.....	.....	.....
48	8/11/15	R. McG.	Dr. Bland.	49	F. F.	S. M.	Epithelioma of cervix.	Radium.	Negative.	See notes and illustration.
49	9/15/15	P. H.	Surgery C.	50	F. F.	S. M.	Angioma of tongue.	4 treatments, 230 mg. hrs.	Remit doubtful.	No local improvement.
50	9/13/15	J. M.	Dr. E. J. Klopp.	51	M. M.	S. M.	Hairy mole on forehead.	Radium to forehead.	Improved.	.....
51	9/28/15	J. F.	Skinner O. P. D.	52	M. M.	S. M.	Rhinocarcinoma.	3 treatments, 5 mg. hrs. at intervals.	Relief from pain.	.....
52	10/1/15	S. H.	Dr. Widdowson.	53	M. M.	S. M.	Epithelioma of cheek.	Radium to lip.	Negative.	Nature of ulcer doubtful.
53	10/8/15	A. E. S.	.....	54	M. M.	S. M.	Chronic ulcer of lower lip.	Radium.	W. M. E. D.	Operation and x-ray previous to radium treatment.
54	10/7/15	XXX.	.....	55	M. M.	S. M.	Epithelioma of cheek. Recurrence of rodent ulcer.	Radium.	W. M. E. D.	12/23/16, has not materially changed. Report of Dr. E.
55	11/17/15	M. G. H.	Dr. Eves.	56	M. M.	S. M.	Carcinoma of left arytenoid.	.....	Improved.	See notes.
56	11/15/15	A. R.	Dr. _____	57	F. M.	S. M.	Fibroid of uterus.	Radium to uterus.	Improved locally.	40 mg. were used in the treatment of this case; apparently increased growth.
57	11/9/15	XXX.	Dr. C. F. Nassau.	58	M. M.	S. M.	Sarcoma of left knee.	.....	Negative.	.....
58	11/12/15	G. O.	Dr. DeCosta.	59	M. M.	S. M.	Recurrent carcinoma of upper jaw.	.....	.....	Did not return.
59	11/16/15	B. C.	Dr. Heekhausen.	60	F. F.	S. M.	Angioma of nose and forearm.	6 treatments, 480 mg. hrs.	.....	Not treated.
60	12/4/15	C. F.	Woman's Hospital.	61	F. F.	S. M.	Hemangioma of face.	9 treatments, 720 mg. hrs.	W. M. E. D.	Examined by Dr. H. in Dec., 1916.
61	12/10/15	XXX.	Dr. B. C. Hirt.	62	F. F.	S. M.	Carcinoma of uterus.	9 treatments, 640 mg. hrs.	W. M. E. D.	See notes. Unusual result.
62	12/14/15	H. A. H.	Dr. G. E. Ery Shoemaker.	63	M. M.	S. M.	Carcinoma of urethra.	3 treatments.	Improved.	.....
63	12/18/15	H. A. H.	.....	64	M. M.	S. M.	Indolent sinus.	5 treatments, 171 mg. hrs.	W. M. E. D.	.....
64	12/23/15	H. W. W.	Dr. E. J. Klopp.	65	M. M.	S. M.	Leukoplakia.	Radium to mouth.	Negative.	.....
65	1/4/16	T. A. St. C.	Dr. Gibbon.	66	M. M.	S. M.	Epithelioma of floor of mouth.	.....	Negative.	Post-mortem proved it to be T. B., tuberculous laryngitis.
66	1/3/16	A. W. S.	O. P. Surgical.	67	M. M.	S. M.	Epithelioma of cheek.	Radium externally to neck.	Negative.	Not treated.
67	1/18/16	E. T.	Dr. L. Burns.	68	M. M.	S. M.	Carcinoma of larynx.	.....	Unknown.	Condition totally inoperable and radium not indicated. Metastasis to peritoneum and liver.
68	1/18/16	W. N.	Dr. W. J. Hall.	69	M. M.	S. M.	Rodent ulcer of nose and x-ray dermatitis.	3 treatments, 420 mg. hrs.	Negative.	Treatment deferred.
69	2/7/16	A. B. D.	Dr. Lafferty.	70	F. F.	S. M.	Carcinoma of uterus.	.....	Improved.	See notes.
70	2/24/16	A. V.	Children's Hospital.	71	M. M.	S. M.	Hemangioma of upper lip.	10 treatments.	W. M. E. D.	See notes.
71	2/28/16	C. M.	Dr. Rankin.	72	F. F.	S. M.	Fibroid, uterine.	Radium to lips.	.....	.....
72	3/1/16	J. B.	Dr. Stallwagon.	73	M. M.	S. M.	Glandular obliteritis post-tonsil.	.....	Negative.	.....
73	3/1/16	J. B.	Dr. Gibbons.	74	M. M.	S. M.	Sarcoma of neck.	.....	Negative.	.....
74	2/28/16	J. M.	O. P. D.	75	M. M.	S. M.	Carcinoma of tongue.	.....	Negative.	Recurrences followed about six months later.
75	3/26/16	F. L.	Dr. Roth.	76	F. F.	S. M.	Sarcoma of head.	640 mg. hrs.	Improved.	See notes.
76	4/5/16	E. H. L.	Oncologic Hospital.	77	M. M.	S. M.	Epithelioma of nose.	.....	W. M. E. D.	See notes. Mass smaller.
77	4/6/16	J. S.	Dr. Conwell.	78	M. M.	S. M.	Carcinoma of tongue.	.....	Negative.	.....
78	4/14/16	XXX.	Dr. Lau.	79	M. M.	S. M.	Carcinoma of prostate.	4 treatments, 130 mg. 10 hrs.	Improved.	.....
79	4/11/16	W. G. S. C.	Dr. Girvin.	80	M. M.	S. M.	Carcinoma of larynx.	.....	Negative.	.....
80	5/1/16	M. M.	Surgical B.	81	M. M.	S. M.	Epithelioma of floor of mouth.	10 treatments, 800 mg. hrs.	Condition worse.	Sent back to H. O. P. D. Surg. B.
81	5/1/16	C. N. H.	Dr. J. C. Cole Brick.	82	M. M.	S. M.	Gynadenoma of testis.	20 mg. by rectum for 4 hours.	Doubtful.	Still under treatment.
82	5/7/16	W. H. H.	Dr. Thoroughton.	83	M. M.	S. M.	Tuberculosis of prostate.	13 treatments, 1560 mg. hrs.	Improved.	Local condition disappeared. Died of T. B. meningitis.
83	5/13/16	H. C.	Dr. Taggart.	84	F. F.	S. M.	Epithelioma of lower left eyelid.	4 treatments, 240 mg. hrs.	W. M. E. D.	See notes and illustration.
84	5/28/16	G. T.	Dr. Girvin.	85	F. F.	S. M.	Carcinoma of cervix.	5 treatments* 400 mg. hrs.	Much improved.	Still in good condition.
85	5/27/16	N. C.	Dr. Blood.	86	M. M.	S. M.	Postoperative sarcoma of cervix.	Radium to vaginal vault.	.....	.....
86	5/27/16	A.	.....	87	F. F.	S. M.	Undiagnosed.	3 treatments.	.....	History removed.
87	6/6/16	S. S.	Dr. E. J. Klopp.	88	F. F.	S. M.	Keloid from burn.	8 treatments, 1120 mg. hrs.	.....	Prefer to wait until fall. Did not return.
88	6/1/16	A. B.	Dr. Blood.	89	F. F.	S. M.	Carcinoma of uterus.	3 treatments, 480 mg. hrs.	Improved.	Still under observation.
89	6/1/16	XXX.	.....	90	M. M.	S. M.	Indolent sinus; T. B. sinus over lower end of sternum.	2 treatments, 180 mg. hrs.	.....	Did not return.
90	6/13/16	J. P.	.....	91	M. M.	S. M.	Carcinoma of neck; ulceration of larynx, with mass upon neck.	.....	.....	.....

CASES TREATED—DIAGNOSIS AND RESULTS—Continued.

No.	Date.	Name.	Referred by:	Age.	M. or F. or W.	S.	Diagnosis.	Treatment.	Result.	Remarks.
84	6/12/16	L. F.	Dr. Bland.	48	F.	M.	Epithelioma of cervix.	10 treatments, 2400 mg. hrs.	Negative.	
85	5/27/16	L. G.	Dr. Wiggins.	71	F.	W.	Epithelioma of face.	6 treatments, 480 mg. hrs., to large ulcer; 4 treatments, 160 mg. hrs., to small ulcer; 16 treatments, 3583 mg. hrs.	Negative.	
86	6/20/16	C. G.	Dr. Wiggins.	54	F.	S.	Uterine carcinoma.	16 treatments, 3583 mg. hrs.	Negative.	
87	7/7/16	A. W.	Dr. Bland.	32	F.	M.	Carcinoma of uterus.	5 treatments, 1100 mg. hrs.	Negative.	
88	7/10/16	W. L. K.	Dr. Heineberg.	82	F.	M.	Carcinoma of cervix.	6 treatments, 638 mg. hrs.	Negative.	
89	7/10/16	C. S.	Dr. Heineberg.	45	F.	M.	Prostatic carcinoma.	9 treatments, 2740 mg. hrs.	Unimproved.	
90	6/29/16	C. M.	Dr. Uhle.	44	F.	M.	Carcinoma of vagina.	6 treatments, 1166 mg. hrs.	Improved.	W. M. E. D. Oct., 1916.
91	7/17/16	L. S.	Dr. B. C. Hirst.	25	M.	..	Carcinoma of bladder.	3 treatments, 400 mg. hrs.	Negative.	
92	7/18/16	E. A.	Dr. Watson.	81	F.	..	Carcinoma of pharynx and parotid.	13 treatments, 1130 mg. hrs.	Negative.	
93	7/1/16	C. H.	Dr. Huss.	6	F.	S.	Portwine mark on left side of face. Nerve.	Still under treatment.	Improved.	Under observation.
94	7/14/16	L. V.	Dr. Stewart.	15	F.	..	Angioma of face.	3 treatments, 200 mg. hrs.	Improved.	Mass about the size of a bean upon the under side of upper lip.
94a	7/24/16	M.	Dr. Mullen.	38	F.	M.	Carcinoma of cervix.	6 treatments, 1472 mg. hrs.	Negative.	
94b	8/3/16	P. McG.	Penna. Hospital.	65	M.	..	Epithelioma of upper lip and mouth.	5 treatments, 364 mg. hrs.	Negative.	
95	8/8/16	I. T.	Dr. Henry Wharton.	70	M.	..	Carcinoma of tongue and floor of mouth.	11 treatments, 88 mg. hrs.	..	Failed to return.
96	8/15/16	J. K.	..	40	M.	S.	Gumma of mouth.	Specific treatment.	Ulcer healed.	Found to be specific. Was doubtful; small amount of radium used pending diagnosis.
97	8/15/16	C. H. P.	..	45	M.	S.	Carcinoma of larynx and trachea.	3 treatments, 480 mg. hrs.	Negative.	Found to be specific.
98	8/17/16	E. F.	Dr. Klopp.	54	F.	..	Sarcoma of finger.	4 treatments, 32 mg. hrs.	..	Left.
99	8/24/16	R. G.	O. P. S. D.	65	F.	M.	Epithelioma of nose.	6 treatments, 880 mg. hrs.	Negative.	
100	8/21/16	C. R.	Dr. E. J. Klopp.	56	M.	M.	Carcinoma of rectum.	5 treatments, 500 mg. hrs.	Negative.	
101	8/21/16	I. B.	Dr. Thornton.	34	F.	M.	Carcinoma of cervix.	8 treatments, 1360 mg. hrs.	Negative.	
102	9/11/16	L. K.	Dr. Rübter.	57	M.	M.	Carcinoma of larynx.	6 treatments, 384 mg. hrs.	Negative.	
103	9/8/16	A. C.	Dr. Mitchell, Penna. Hospital.	28	F.	..	Squamous-cell carcinoma of cervix.	4 treatments, 880 mg. hrs.	Negative.	Did not return.
104	9/14/16	Z. B. B.	Dr. Jopson.	76	M.	..	Sarcoma of testicle.	8 treatments, 600 mg. hrs.	Negative.	
105	7/18/16	H. Z. B.	Dr. Henry Wharton.	..	M.	..	Rectal carcinoma.	2 treatments, 160 mg. hrs.	Negative.	Died.
106	7/16/16	H.	Dr. Hodge.	..	F.	S.	Epithelioma of face.	3 treatments, 1520 mg. hrs.	Negative.	Still under observation.
107	9/19/16	M. H.	Dr. Gibbon.	64	F.	M.	Carcinoma of mouth.	4 treatments, 687 mg. hrs.	Negative.	
108	9/24/16	J. E.	Dr. Stauffer.	72	F.	M.	Carcinoma of nose.	6 treatments, 2400 mg. hrs.	Negative.	
108a	9/26/16	D.	Dr. DeCorta.	..	M.	S.	Sarcoma of dura.	4 treatments, 687 mg. hrs.	Negative.	
109	8/21/16	J. L. T.	Dr. Jopson.	82	F.	W.	Carcinoma of face.	14 treatments, 1079 mg. hrs.	Died of apoplexy.	Still under observation.
110	10/10/16	G. B.	Dr. Stryker.	52	M.	M.	Granuloma of roof of mouth.	8 treatments, 620 mg. hrs.	Improved.	Tumor became smaller, hemorrhage less.
111	10/17/16	H. B.	Dr. Quetzall.	..	M.	..	Carcinoma of pharynx.	4 treatments, 572 mg. hrs.	Improved.	
111a	10/29/16	A. S.	Dr. E. J. Klopp.	..	M.	..	Carcinoma of throat.	4 treatments, 880 mg. hrs.	Negative.	Still under observation.
112	10/30/16	A. S.	Dr. C. D. Nassau.	85	M.	..	Rodent ulcer of right side of nose.	6 treatments, 440 mg. hrs.	Negative.	
113	10/30/16	E. N.	Dr. Spiess.	24	F.	M.	Sarcoma of upper jaw.	5 treatments, 360 mg. hrs.	Much improved.	Under observation.
114	11/16/16	F. C.	Dr. W. A. Schatz.	56	M.	S.	Carcinoma on pharynx.	..	..	Under treatment.
114a	11/17/16	U.	Polyclinic Hospital.	..	M.	..	Carcinoma of throat.	12 treatments, 960 mg. hrs.	..	Under treatment.
114b	11/22/16	P. M. B.	Dr. S. MacCuen Smith.	..	F.	M.	Uterine carcinoma.	3 treatments, 960 mg. hrs.	..	Under treatment.
115	11/23/16	B. K. L.	Dr. Hugh Hanna.	50	F.	M.	Recurrent carcinoma of uterus.	4 treatments, 1760 mg. hrs.	..	Under treatment.
116	11/26/16	H. L.	Dr. E. E. Montgomery.	60	M.	..	Carcinoma of throat and pharynx.	5 treatments, 640 mg. hrs.	Died.	
117	12/13/16	E. H.	Dr. Masland.	45	M.	M.	T. B. of larynx.	..	..	Under treatment.
118	12/26/16	R. K.	Dr. Dickman.	9 mo.	F.	S.	Angioma, cavernous, of face and forehead.	..	..	Under treatment.
119	12/27/16	J. H. M.	Dr. E. E. Montgomery.	66	M.	M.	Epithelioma of cheek.	..	..	Under treatment.
120	11/18/16	D. S.	..	63	M.	..	Epithelioma of face.	..	..	Under treatment.

Many of these cases are of interest, while others call for no comment. Many were in a desperate condition, and treatment was given for relief of physical and mental suffering. Furthermore, no one is capable of passing judgment without a trial; for under some circumstances the most unpromising cases will be restored temporarily, while it must be acknowledged that, *per contra*, often the most promising will fail. The word "cured" for obvious reasons has not been used; "W. M. E. D." (without manifest evidence of disease) has been substituted.

UTERINE CARCINOMA.

One of the most interesting groups in this list is that of the patients suffering from inoperable carcinoma of the uterus.

Case 1.—M. L. K., referred by Dr. William Duffield Robinson, in March, 1913, had a complete hysterectomy performed and remained comfortable until April, 1914, when a slight bloody discharge was noted, which gradually became more profuse. This was accompanied by an increase of the discomfort. Examination when treatment began, December 2, 1914, showed an irregular indurated mass involving the upper and posterior portion of the vagina, and fixation of all pelvic structures. Manipulation was followed by profuse bleeding from the ulcerated surfaces, and a vaginal discharge existed, which was extremely foul and required frequent douches.

The treatment consisted of 20 mg. applied in a small tube surrounded by 1/10 mm. of lead foil wrapped in cotton and placed in a glass tube. Applications were made three times a week for six weeks, and then omitted for about the same time, when they were again continued for two months. On October 21, 1915, examination showed that the ulcer within the vagina had healed, but there still persisted a more or less thickened condition of the pelvic structures. The patient also complained of pain in the back.

In the light of similar cases a general radiation of the lower abdomen was adopted, which was followed by relief.

On December 4, 1916, there was a recur-

rence of the disease about the umbilicus, from which a mass protruded about the size of a horse chestnut, ulcerated upon the surface. The mass was first noticed about one month before. A small nodule also appeared above the clavicle on the left side and was about the size of an almond. During the previous two years the patient had been practically free from disease, free from pain, and free from discharge, and although thinner had been able to attend to her usual duties.

Case 10.—L. D., referred by Dr. Paterson, in June, 1914, noticed a bloody discharge, which gradually became worse, some pain and discomfort in the pelvis. Owing to the extension of the disease, and the size of the patient (weight 265 pounds), operation was impossible. On January 18, 1915, examination was difficult on account of fat. Although the patient had never borne children, there existed a well-marked rectocele. The uterus was greatly enlarged and appeared to be fixed posteriorly. Microscopical examination of tissue taken from within the uterus proved it to be an adenocarcinoma. The treatment consisted of applications of 22 mg. of radium (later reduced to 11 mg.) enclosed in a 1/2-mm. lead tube covered with celluloid, placed within the uterus and left for four to eight hours. A total of 26 treatments were given before April 17, 1915. During August and September, nine more seven-hour applications were given.

Pathological examinations from scrapings, examined by Dr. Ellis, of the Pathological Department, found, on January 30, 1915, and March 22, 1915, adenocarcinoma, and on May 1, 1915, and November 12, 1915, simply showed endometrium and blood clots. On October 3, 1916, the patient was still able to continue her work and had been free from discharge, but had some little discomfort in the pelvis.

By referring to the list, it will be seen that several others have likewise improved (Cases 4, 48, 60, 79, 90). It is of interest to observe the marked contraction of the remaining vaginal canal in those cases which recover. Attention has been previ-



CASE 21.—The edge of the tumor can be seen by a line extending from the inner canthus of the right eye down and over the bridge of the nose. The small discolored portion upon the bridge of the nose is about one-quarter the size.



CASE 21.—After treatment. Note pigmentation beyond edges of the growth.



CASE 33.—Nevus before treatment.



CASE 33.—Nevus after treatment. Still under treatment.

ously called to this, in a report of 50 cases made in the *New York Medical Journal* for July, 1915. Some authorities have stated that only large amounts of radium should be used in the treatment of these cases. In the number that have come under my observation it would appear that small, frequent doses continued over several months, followed by radiation of the whole lower abdomen, will give better results than the

use of large amounts of radium locally over a short space of time.

CARCINOMAS ELSEWHERE.

Carcinoma of other parts of more than common interest are: An advanced rectal case (No. 18) and two prostatic cases (Nos. 8, 74a). The difficulty of applying and directing the radiation so as to do no harm to the surrounding structures was at



CASE 38.—Angioma of scalp before treatment.



CASE 38.—Angioma of scalp after treatment.



CASE 47.—Hairy mole of cheek. After treatment. Note pigmented area beyond the area treated. No picture taken before treatment.

times a harassing problem. In a laryngeal case (No. 15) attempts were made to treat the growth from within. This was finally abandoned, and the "cross-fire" method was adopted. Case 60a, carcinoma of the urethra, was unable to void urine, and only the smallest catheter would enter the blad-

der. Details of this case have been reported by Dr. Shoemaker in *Surgery, Gynecology and Obstetrics* for June, 1916.

FIBROIDS.

Five cases of uterine fibroids were treated with good results (Cases 8, 12, 41, 42, 56). In all, bleeding was profuse and operation was impossible for various reasons. Treatment was followed by a cessation of hemorrhages, while the masses contracted to small nodules. Case 56 was complicated with carcinoma of the left breast and with bone metastasis. The bleeding from the fibroid was checked and the mass was decidedly reduced.

Case 8 was complicated by chronic nephritis. While the mass extended well above the pelvic brim, it was firmly wedged in the true pelvis and gave a great deal of discomfort. Treatments were given in the usual manner, and while there was little evidence of local reaction the urine became loaded with albumin, heart was irregular and weak, limbs were swollen, and all the symptoms of cardiac and renal insufficiency were present. These alarming symptoms lasted for about one month, when they gradually subsided. During this time the mass had greatly decreased and the menses ceased entirely. It is difficult to state in this case if this acute condition was due to the absorption of material from the fibroid



CASE 50.—Hairy mole. Before treatment.



CASE 50.—After treatment. Mass over eye is due to the thickened bone.



CASE 78.—Epithelioma before treatment.



CASE 78.—Epithelioma. Six months later.

undergoing retrograde change, or if it was purely accidental, due to the nephritic condition.

SARCOMAS.

A number of sarcomas of severe types were treated, and while it was possible in some instances to control the local condi-

tion, metastases followed in such rapid succession at most unexpected places that it was not possible to anticipate the location. This is contrary to the usual experience in these cases, and in this list the beneficial results have been entirely upon the carcinoma side.

SUPERFICIAL EPITHELIOMAS.

A number of cases of superficial epithelioma upon the face and within the mouth were treated and yielded promptly, giving very good sound scars with very little disfigurement. Some of them had been treated by other methods, even the Roentgen ray. Radium is particularly useful in cases about the eye, or about the ear, in the folds, where it is difficult to direct the Roentgen ray without doing harm to surrounding structures; even within the nose or mouth it can be applied easily.

Cases 23, 34, 35, 54, 73, and 78 exemplify the nature of these external conditions. No. 73 came under observation in the spring of 1909, and was treated with radium at that time. Several small recurrences have taken place since, which have been promptly relieved by the use of radium, while the case has all the appearances of a "rodent ulcer." The disease extends deep into the left naris (see *Jour. A. M. A.*, Aug. 29, 1914).

Case 78 is also of interest, as it had been unsuccessfully treated with the Roentgen rays. Small epitheliomas within the oral cavity in the great majority of instances yield to the influence of radium. If, however, the disease has involved the deeper structures, it is very likely that the glands in the neck have also become invaded, and the case is usually hopeless. However, a number of cases have come under observation in which the glands in the neck have become enlarged and have subsided after the ulcer healed. In these instances the enlargement was due to pus (see Cases 7, 20).

ANGIOMAS, MOLES, AND NEVI.

A number of these cases have been treated with exceptionally good results, and while several of the more extensive are still under observation, the time required is fully justified by the result. Where the mass is localized and can be covered by one or two applications the process is easy, but where the mass is extensive, over an irregular surface with varying thicknesses of fibrous tissue as well as the blood-vessels, removal

is often quite difficult. This is well illustrated in Case 50, in which the left forehead was covered with a very thick growth of hair upon a base of heavy tawny-brown skin. After the hair had been removed and the color bleached, the underlying structure was found to be a hard bony mass. Another case similar to this was No. 47. Here, however, the growth of hair was upon the cheek, and the underlying mass was softer. A very gratifying result was obtained. Case 21, a cavernous nevus, and Cases 11 and 38 gave results equally as good. A complete report of these cases will be found in the *American Journal of Roentgenology*, January, 1917.

UNCLASSIFIED CASES.

Three cases in this list proved to be specific in origin, and when placed upon proper treatment responded as would naturally be expected. This point is merely mentioned, as they had all been under the observation of several of our best-known clinicians. No. 69 suffered from an unusual condition—cheilitis. The lower lip was swollen and the inflammatory condition reached well down upon the inner side. A fair degree of reaction was produced from the radium, and when it subsided the mucous membrane was apparently perfectly healthy.

No. 17, a case of splenomegaly, showed remarkable improvement while under treatment. This case has suffered several relapses. The interesting changes in the blood have been fully reported by Dr. Joseph Sailer before the College of American Physicians, 1916.

TECHNIQUE.

About two years ago, when the department was established, it possessed a little over 20 milligrammes of radium; since that time it has gradually increased its supply until the amount at the present time slightly exceeds 200 milligrammes. Necessarily the technique has also been modified. Only a general outline can be given at this time.

Where deep radiation was desired the radium tube was surrounded with thin sheets of lead varying in thickness from

1/10 to 2 millimeters, the scattering rays were guarded by lead several times thicker than that used for the filter, and all metal was then guarded from secondary radiation by several layers of gauze or paper. If possible the radium was not applied to the same place a second time.

If the surface was moist, or if deep radiation was needed within a cavity, sheet rubber was employed for the last cover, or frequently celluloid or glass tubes were used. The same general principles were adopted regarding the protecting lead shields and filters.

Upon the surface where a uniform radiation was needed the tubes were placed at a certain distance from the desired spot, so that all rays would strike with uniform intensity. In cases of nevi a small pill-box was employed and three small tubes placed upon the top at equal distance apart, so that the space between the top and bottom

of the box would be equal to the space between the tubes. Filters of varying degree were interposed. In other surface cases in which deep radiation was desired the general rules previously given were adopted.

Measurements of radiation were made by the milligramme-hour, always considering the intervening air space and filters.

As a rule frequent, short applications were used, as apparently the after-reaction can be better controlled. However, in cases living at a distance the usual massive dose was employed.

In conclusion, attention is called to the very wide difference in the cases contained within this list, and careful analysis will show that in those to whom radium gave relief and comfort it could not have been accomplished by any other known means. Therefore, one feels justified in the time given to this class of sufferers.

THE DIFFERENTIATION OF ABDOMINAL PAIN AND ITS BEARING ON TREATMENT.¹

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Pain has wisely been termed the guardian of health; the cry of nature for assistance; a blessing in disguise for which we should be, but are not always, grateful, for no one "has as yet learned to love its rod." Its refining and ennobling influence on the disposition and character of erring mankind has been the theme of poet and novelist in all ages. Its significance to the internist and to the surgeon is self-evident, and I should have hesitated to adopt it for the subject of this evening's talk were it not that its language is oftentimes obscure and frequently misunderstood, and that what I have gained from a wide and varied experience might be of some use in reading aright some of its less clear indications, especially with reference to its location in the abdomen.

That there is a cause for every pain is a

trite axiom, and our object should be not merely to relieve the pain but to remove the cause. Like many physical manifestations there is a psychological element in pain, so that it is difficult to estimate its severity. We cannot always rely on what our patients tell us as to its intensity or otherwise; what is excruciating to one may be passed off lightly by another. It is here that experience and that indefinable gift—intuition—are of so much value. Lacking these it is important that the clinician should disregard no complaint of pain. The subjective pains of the neurotic individual are not rarely found to be due to some pathological condition of the nervous system, while the more common objective pain is a distinct indication of tissue injury which dare not be ignored.

One of the greatest difficulties in the correct interpretation of pain is that the sensation is often reflected to regions

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remote from the actual site of the lesion causing it. This is perhaps better illustrated by pain in the abdomen, and also in the chest, than elsewhere in the body economy. It is a well-known fact that the abdominal organs are almost insensitive to pain, and that it is the exquisite sensitiveness of the abdominal wall that accounts for the prominence of pain in the symptom-complex of visceral disease. In other words, the stimulation of the nerve centers gives rise to pain which is referred to the peripheral distribution of these nerves in the body wall. Ordinarily we are not conscious of visceral functions. Peristalsis takes place and we know it not, but when for some reason or other it becomes violent, we are conscious of it in the form of pain, presumably due to disturbance of associated nerve tracts of the parietes.

Abdominal pain is due to intrinsic and extrinsic causes. Not a few failures of diagnosis in supposed abdominal disease are due to lack of consideration of the extrinsic causes of abdominal pain. We should never forget the law that any irritation of a sensory nerve is referred to its end organ. This makes clear the abdominal pains which are due to lesions of the spinal cord, or to diseases of the spine which affect the efferent nerves, such as caries, tumors, and arthritis deformans; also certain types of neuritis in the abdominal nerve distribution. In certain neurological cases abdominal pain may even be of central origin, explainable only by the hazy and dangerous mysticism of functional cerebral disorders.

Still other varieties of extrinsic abdominal pains are of the reflected variety, such as the epigastric crises of angina pectoris and the abdominal pains of basal pleurisy. These and other obscure conditions may present difficulties of diagnosis that are well-nigh insuperable and require the greatest amount of care in combining the results of the history and the examination.

The most familiar example of abdominal pain in which some spinal cord lesion is the underlying cause is the gastric pain of tabes. The differentiation is not difficult, since the gastric crises usually occur in the stage of the disorder when the symp-

toms are already sufficiently pronounced to enable a correct interpretation of the origin of the gastric symptoms. The most common cause for mistaking this condition for an intra-abdominal catastrophe is the failure to think of it. That the error is not uncommon, however, is shown by the series of cases of tabes reported by Nuzam from the Cook County Hospital, Chicago, in which he showed that approximately ten per cent of about 1000 cases had been subjected to abdominal operation for gastric or duodenal ulcer, gall-bladder disease, appendicitis, or other supposed lesions of the abdominal viscera. An example of pain referred to the lower right abdominal quadrant is that caused by acute epiphysitis of the upper end of the right femur; acute coxalgia of the right side; acute osteomyelitis of the right great trochanter can be the cause of pain being referred to the above region.

Fortunately nature has not drawn too many barriers across our trail, and in the vast majority of cases of abdominal pain the exciting cause is to be found in demonstrable disease of one or other of the occupants of the abdominal cavity. One must not too readily conclude that pain in the abdomen is of referred or reflected nature. It is possible for the tabetic to have abdominal disease, and I have operated upon the insane for appendicitis neglected until an abscess mass made the condition unmistakable.

That abdominal pain may be due also to a local manifestation of a general condition not amenable to surgical treatment is also true. The visceral crises of angioneurotic edema or purpura so well portrayed by Osler are examples, fortunately rare, of this type.

In general, therefore, while we may say that the alert clinician will keep a corner of his eye open for this extrinsic cause of abdominal pain, he will do well to center his full gaze upon the contents of the abdomen when pain dwells therein.

In general, abdominal pain is due chiefly to derangements of function resulting in tension, or to inflammation, or to both. The severe and rhythmic character of spasm or

contraction of a hollow viscus is due to obstruction and represents the excess activity of the organ to break down the obstruction and the relaxation caused by fatigue resulting from the effort. We see this in its pure form most often in calculous disease of the genito-urinary and the biliary tract. Typically the pain in renal colic begins in the lumbar region and radiates forward and downward over the lower abdomen, and is referred to the genital organs. But how often do we see departures from the typical in the location, severity, and radiation of pain. The presence of stone in the right ureter in some of these cases not infrequently produces symptoms of appendicitis, a fact which should be borne in mind in the diagnosis of appendicitis. Ureteritis, stricture of the ureter, and pyelitis have been mistaken for appendicitis and the patient operated for the wrong thing; one of the watchwords is, **always examine the urine**. Typical gall-stone colic, with its pain in the right abdomen referred to the right shoulder and back, is familiar to all of us, but very often the pain is entirely located in the epigastrium, and it is then difficult to distinguish it from other diseases of the upper abdomen. In order to make the distinction it is necessary to be familiar with the clinical picture presented by other intra-abdominal affections, which we shall discuss presently.

Intestinal colic is another type of obstructive abdominal pain. This is too often attributed to some dietetic error, the most favorite diagnosis being ptomaine poisoning. The latter is in reality a rare condition, and, except in cases actually due to some tainted food, intense pain with vomiting and sweats and collapse will usually be found to be due to other causes, such as perforated viscus, pancreatitis, extrauterine pregnancy, abortion, or some septic condition of the abdomen. Severe intestinal colic is at times due to the presence of fecal masses, the removal of which soon relieves the condition.

Again, it may be due to the irritating effect of abnormal contents, causing inflammation and hyperperistalsis with re-

sulting colicky pain. The most important decision to be made by the physician when confronted with the diagnosis of colic is to eliminate organic obstruction. Regularly recurring cramps are significant of true obstruction. Hyperperistalsis from other causes rarely shows the regularity, the persistence, and the similarity of location that are characteristic of organic obstruction. Irregular intermittency of pain, with shifting position corresponding to the segment of the intestine which is undergoing the violent vermicular contraction, is indicative of enteritis. As a rule obstructive pain is more severe than that of enteritis, though the latter may on occasion be equally severe. Naturally other symptoms, together with the history and the physical examination, enter largely into a diagnosis, but to-night I must merely point out that a painstaking development of the various characteristics of the pain in these various conditions is of greater value than is ordinarily appreciated, and, especially in doubtful cases, may be decisive.

There is one variety of colic about which we formerly heard much but fortunately nowadays but little is said. I refer to appendicular colic. I am willing to admit what is perfectly true, that the appendix suffers frequently from obstruction by concretions, strictures, kinks, torsions, and inflammatory swellings. That it occurs independently of inflammation of the appendix I am very skeptical. Appendicular colic is always appendicitis, and it is a mistake to label it otherwise. If obstruction is the primary feature, at any rate inflammation treads upon its heels and in the vast majority of cases soon rules the scene. Appendicular colic, on the other hand, is a frequent result of appendicular inflammation. In this particular segment of the intestinal tract it is a mistake, therefore, to attempt to differentiate inflammation from obstruction. They are one and inseparable in the majority of cases, and the indications are the same.

As a general rule all agonizing abdominal pains belong to the surgeon. I trust my friends the internists (who would better be called externists, as they do all their

work on the outside) will not think I am unduly grasping in making this assertion. We have fortunately outlived the age of sensory neuroses—"algias" and other diagnoses, which were names only. We are approaching the time when the surgeon will be called in every case of severe abdominal pain. To the excruciating group of abdominal diseases belong acute pancreatitis, mesenteric and mesocolic thrombosis, the stone colics, perforations of the gastrointestinal tract, extrauterine pregnancy, and twisted pedicles, all surgical conditions, and all conditions that may and often do call for prompt action to avert fatality. In striving for efficiency we should endeavor to cut down the latent period of diagnosis before treatment. The watchful waiting policy while pathology is making its onslaught cannot be other than disastrous. This can best be done by the promptest coöperation of the surgeon with the family physician.

One of the most common severe seizures of this group is without doubt that due to perforation of a gastric or duodenal ulcer. The pain is stab-like, intense, and is referred to the upper abdomen, which soon assumes the characteristic board-like rigidity. Very often in these cases infection extending downward toward the right iliac fossa causes extreme tenderness in the appendiceal region and suggests acute perforating appendicitis and peritonitis—a diagnostic error of almost banal frequency and one which is not always avoidable even with a most carefully taken history. The operative mortality in perforating duodenal ulcer in my experience is almost negligible—one death in 46 operations up to date. I do not hesitate to give all credit for this happy result to the prompt action on the part of an intelligent clientele of physicians.

The average case of acute appendicitis is readily recognized by most physicians, beginning, as it generally does, in the periumbilical region and soon localizing in the right iliac fossa. Yet the pain of this disease, both subjective and as elicited by examination, presents the most marked variations. Much depends upon the length of the appendix and the situation of its inflamed portion. For the sake of making

an impression upon students I often say that if an appendix were to pass out of the abdominal cavity by way of either sacrosciatic foramen and continue its course through the popliteal space to the os calcis, and that person were to have appendicitis, he would have pain referred to his heel. Similarly a common cause of pelvic pain and left-sided tenderness is the pelvic appendix.

In many instances the seat of any lesion causing abdominal pain cannot be correctly surmised from the unaided description of the patient. In such cases we resort to the ordinary means of producing pain in the suspected location by pressure. A most useful expedient which I can recommend is to have the patient cough. In the presence of an acutely inflamed focus within the abdomen the impulse imparted to it by the sudden descent of the diaphragm will often point out to the patient and to the surgeon the exact location of the sore spot. This is particularly valuable in locating a diseased appendix before the early central pain has localized in the right iliac fossa. *Per contra*, it is true pain in the right iliac fossa in the female is oftentimes referable to some acute condition of the right ovary and of the Fallopian tubes. This is largely a matter of the position of the affected organ.

The pyloric orifice, the duodenum, the gall-bladder and biliary ducts, the head of the pancreas, and the hilum of the right kidney are all found within a very small area which can be covered by the palm of the hand upon the anterior abdominal wall, and the appendix is not distant. It is small wonder that these organs, accustomed as they are in a state of health to localization of sensations, should, when diseased, fail to speak an unmistakable language.

The pain of chronic gastric and duodenal ulcer, the most frequent site of which is near the pylorus, is epigastric and is sufficiently marked by its gnawing character, its periodicity, and its relation to food intake, to make it unmistakable in typical instances. Gall-bladder disease causes pain in the right hypochondrium, radiating to the right. Involvement of the pancreas

produces a low or central pain. The onset of pain in chronic appendicitis may suggest a lesion of almost any of the intra-abdominal organs mentioned, but it generally localizes in the appendiceal region, and the accompanying tenderness and rigidity of this region help to indicate the true nature of the trouble in the greater number of cases.

Intra-abdominal adhesions are often a convenient diagnosis with which to impress a patient whose abdominal pain does not suggest any definite lesion. I have elsewhere sounded a warning note, which I here repeat, against dangerous and difficult operations which have come into vogue for the relief of such supposed conditions, congenital or acquired. There is no doubt that pain of every degree may be caused by adhesions, but I again put the question, What is the normal arrangement of the abdominal viscera for a given individual? In reality we do not know, for people's viscera vary as much as does their physiognomy, though "in the image of God He created them all."

Pain of itself is not a clinical entity, and it is too often upon associated signs, such as local tenderness (referred pain never produces a tenderness at the referred area), spasm, vomiting, fever, chills, etc., and also on the history of the illness, that we must to a great extent rely in making our diagnosis, and finally on that sixth sense with which a favored few are endowed—intuition. The advances in abdominal surgery have contributed much to our knowledge of the immediate as well as the remote causes of pain. The early exploration has been responsible for bringing to the light of day the previously obscure causes of many varieties of abdominal pain.

Postoperative pain, real or fancied, has been one of the great bars to the general dissemination of many of the benefits of surgery. To avoid pain many have chanced the most horrible of deaths and lost. Our greatest regret is the painless nature of malignant disease in its incipiency. But we must reckon with human nature and minimize to every degree consistent with safety the sufferings incident to surgery.

In so doing I want to sound a warning note against the practice of narcotizing abdominal patients which has obtained recently in certain high quarters, what I cannot refrain from calling pseudo-scientific support. I have passed through that struggle once and am now satisfied. If I want to know just where my patients are on the journey to recovery I do not want them drugged to stupefaction. I do not want to put their primitive vegetative functions at a disadvantage to pander to a weakness of the flesh. Morphine is truly God's own medicine, but only when used rightly and with discretion. The pains that occur after operation are in some instances like unto those that occur before operation, a warning. Even with the signal it may be difficult enough to sight the danger. Without it the patient may be upon the rocks and the surgeon taken unawares. The differentiation of abdominal pain occurring on the second or third day, or later, after operation is oftentimes puzzling. The pain of distention and obstruction is usually colicky and spasmodic, showing a definite relationship to peristalsis; there is generally neither tenderness nor rigidity; the degree of severity of the pain indicating whether it is being caused by distention or by obstruction. Postoperative peritonitis, on the other hand, produces muscular rigidity and tenderness, peristalsis is absent, the pain is constant and unremitting, the latter being, perhaps, the most marked distinction between peritonitis and postoperative pain of mechanical obstruction and distention.

We have thus far considered only the positive character of abdominal pain. There is also a negative side to the question—that is, the absence of pain when it normally should be present. As in peritonitis it is that ominous silence of the belly wall that causes such mental distress to the surgeon, so also the sudden cessation of abdominal pain with or without the usual accompanying indications of improvement—reduced temperature and reduction in the leucocyte count—portends a serious and grave state of affairs, indicating a ruptured or gangrenous appendix or perforation of an abscess into the peritoneal cavity, a con-

dition not readily understood or recognized by the occasional operator or the tyro in surgery.

It is perhaps not out of place to say a word about painless abdominal conditions. I have on a number of occasions removed an intensely inflamed appendix as an incidental procedure during some abdominal operation, the patient being absolutely free from any pain referable to the condition prior to operation. Gastric and duodenal ulcers may exist for months and perhaps for years without any pain, or at least a minimal and trifling amount. Infection lurks at times in the gall-bladder from childhood to old age and only occasionally does suffering result therefrom. Yet these and other foci may serve as the laboratory in which toxins are manufactured and distributed to the body. They may be the portal of entry of many an obscure infection, and at bottom they may be responsible for a vast number of organic changes that masquerade under other names and are attributed to other causes. The degree of pain is not the index of treatment. It should be the aim of all of us to eradicate, not to palliate, disease. The recent extensions of the significance of infection we have no time to develop here, but we may note that pain does not always serve to point that which should be done. Yet pain is a faithful ally of both physician and surgeon, and thus we come back to extolling its beneficent character. It is not a thing to be denied, a devil to be exorcised, but one of God's great gifts, worthy of our study, our admiration, and our praise.

HOME-MADE BREAD SUBSTITUTES FOR DIABETIC PATIENTS.

In the *British Medical Journal* of December 23, 1916, WILLIAMSON states that in England they have a number of diabetic breads which, chemically, are quite satisfactory, and to many patients palatable. But other patients find that many of them are unpalatable, and the cost has always been an objection with poor patients; this objection is greater now, as the war has in-

creased the cost of most diabetic breads very considerably. The following directions for home-made bread substitutes may therefore be of some service.

Williamson has used the first two bread substitutes for three years in the treatment of his patients at the Manchester Royal Infirmary, and has found them very satisfactory and cheaper than diabetic breads. Before the war the cost of these bread substitutes was only about half the cost of the best diabetic breads, but owing to the great increase in the price of food it is now difficult to make a satisfactory comparison of the exact cost.

In his own house he has no difficulty in preparing these cakes. In the kitchen at the Manchester Royal Infirmary difficulties were reported, but these were finally overcome, and for three years satisfactory cakes (1 and 2) were prepared for his patients at that hospital.

Many patients find these cakes more palatable than diabetic bread; some find them quite as palatable; whilst others find them less palatable than many pure diabetic breads.

1. *Biogene and Gluten Cakes.*

Biogene, 3 tablespoonfuls.
Satisfactory gluten, 2 tablespoonfuls.
Baking powder, half a teaspoonful.
One egg well beaten up.
A small pinch of salt.

Mix well together, adding the baking powder last (just before baking). A little water may be added, if necessary. Drop into six tins, and bake for twenty minutes.

2. *Biogene and Cocoanut Cakes.*

Mix a quarter of an ounce of yeast with four tablespoonfuls of lukewarm water. Add one and a half tablespoonfuls of desiccated cocoanut powder. Mix well. Cover and leave to ferment in a warm place (not hot) for one hour. Then beat up one egg with a little warm water; add this and six tablespoonfuls of biogene to the above. All should be well mixed into a stiff paste. Place in six small pattie tins. Bake in a moderate oven twenty or twenty-five minutes. When taken out of the oven allow the cakes to stand for ten minutes, and then slip them out of the tins with a knife, and allow them to dry. The tins should not be greased.

3. *Gluten and Cocoanut Cakes.*

Mix a quarter of an ounce of yeast with four tablespoonfuls of lukewarm water. Add one and a half tablespoonfuls of desiccated cocoanut powder. Mix well. Cover and leave to ferment in a warm place (not hot) for one hour. Then

beat up one egg with a little warm water; add this and three tablespoonfuls of gluten to the above. All should be well mixed into a stiff paste. Place in six small pattie tins. Bake in a moderate oven twenty or twenty-five minutes. When taken out of the oven, allow the cakes to stand for ten minutes and then slip them out of the tins with a knife, and allow them to dry. The tins should not be greased. These cakes should be toasted and buttered and not eaten cold.

4. *Cocoanut, Casein, and Gluten Cakes.*

Desiccated cocoanut powder, 2½ ounces.
Casein, 2 ounces.
Biogene, half an ounce.
Gluten flour, 1 ounce.
Two eggs.

Place the cocoanut powder in a dish; mix it with a quarter of an ounce of German yeast; cover it with water and mix well. Leave the mixture in a warm place (not hot) for one hour. Then add the casein, biogene and gluten flour, two eggs (beaten up), and a small pinch of salt; mix well and drop into six small tins. Bake for twenty-five minutes. These cakes only contain a very small amount of starch; to many patients they are quite palatable, and before the war the cost was small.

5. *Cocoanut Cakes.*

Half an ounce of German yeast.
Two tablespoonfuls of lukewarm water.
Eight ounces of desiccated cocoanut powder.

Mix into a paste, adding a little more lukewarm water if necessary. Leave in warm place for one hour. Then add one egg (beaten up in two tablespoonfuls of milk) and a little salt. Mix well. Place in eight small dishes or tins (well greased). Bake in a moderate oven twenty or thirty minutes. These are the cheapest diabetic cakes.

6. *Almond Cakes.*

These can be made in a similar manner; almond flour being used in place of cocoanut powder.

Cakes 2, 5, and 6 are free from starch, and should be practically free from sugar if prepared satisfactorily. Cakes 1, 3, and 4 contain a very small percentage of starch, as the gluten flour used contains 5 or 6 per cent of starch.

If the patient is unable to eat these cakes, or unable to have them prepared satisfactorily, or if they are too expensive and the pure diabetic bread also too expensive, then it is better that he should take a small amount of ordinary white bread, three ounces daily, rather than take cheap, impure diabetic bread in indefinite quantities. It is always desirable that all diabetic breads should be tested roughly by the medical man before they are advised to patients. This may be done by dropping a little of the

following solution on to the cut surfaces of the diabetic bread:

Iodine, 1 grain.
Potassium iodide, 1 grain.
Water, ½ ounce.

A deep blue-black coloration is produced if the bread contains much starch.

This simple test is sufficient to show that a large number of the very palatable cheap diabetic breads are loaded with starch, and therefore unreliable. A number of the reliable bread substitutes should be tried, and the patient should continue to take the most palatable of these reliable preparations. But the patient should be allowed to try only reliable diabetic breads—that is, those which the medical man has found from his own testing to be satisfactory.

Williamson thinks that most patients will find one or more palatable cakes amongst the six for which directions for preparation have been given in this note, and the cost will be considerably less than that of diabetic breads. The cheapest are the cocoanut cakes, and the combined cocoanut, casein, and gluten cakes. All are satisfactory chemically, if carefully prepared. Probably most patients will find the biogene and gluten cakes or the combined cocoanut, casein, and gluten cakes the most palatable.

SHALL WE TREAT THE PARETIC?

In the *Journal of the American Medical Association* of January 20, 1917, RIGGS and HAMMES reach these conclusions:

1. Both clinically and biologically it has been demonstrated that treatment is a material benefit to the paretic.

2. Before the salvarsan era the number of remissions varied from four to twenty per cent. Since its use and the employment of modern forms of therapy, they have been greatly increased in frequency.

3. Treatment, to be effective in paresis, must be given in its earliest stages; in cases of long standing it is useless; cell destruction cannot be replaced. Also, to be effective, it must be persistent. It may be a matter of many months before the activity of the infection can be influenced.

EDITORIAL.

SHOCK AND VASCULAR COLLAPSE.

More than thirty years ago Dr. H. C. Wood, at one time Editor of the THERAPEUTIC GAZETTE, impressed upon his students, when teaching therapeutics, that a dominant condition in that state which is commonly called "shock" depended upon profound vascular relaxation; and in the first edition of his book upon Therapeutics, which the present Editor of the GAZETTE wrote nearly thirty years ago, he also emphasized this point. About fifteen years ago certain investigations by surgeons, rather than by physicians, served to greatly increase the interest of the profession in this important matter, and since that time a large number of researches have been carried out. Although some of these have been thought to indicate that other factors are important in shock, the conclusions reached have practically been identical with those which were emphasized during the earlier time of which we speak.

One of the most efficient supporters of the theory that shock consists largely in vascular relaxation has been Porter, whose experiments upon animals have certainly confirmed the observations of earlier investigators.

In the *Boston Medical and Surgical Journal* Porter has recently contributed an interesting article upon "Shock in War" as a result of observations made by him in France during the present great conflict. Briefly stated these observations, made close to the firing line, upon soldiers recently and severely wounded, confirm his investigations upon animals and indicate clearly that measures directed toward the restoration and maintenance of an approximately normal blood-pressure are absolutely essential.

Porter states that from a practical standpoint shock exists when the diastolic pressure is 60 millimeters or less, as the blood then accumulates in the portal veins, the activity of the heart is impaired, and the nutrition of the nerve cells is affected. He

recommends that a patient suffering from shock should be put with the head below the heels so that the abdominal vessels will be higher than the heart and brain; that artificial heat shall be applied and intravenous injections of normal saline administered, to which adrenalin should be added when needed. In some instances transfusion of blood seems to be necessary.

That the exact condition of the patient may be determined and further treatment decided upon he recommends the taking of the diastolic pressure every half-hour. He does not wait until the diastolic pressure is as low as 60, but if it is below 80 advises that normal saline solution shall be injected into the vein to the extent of about 500 Cc. It would seem that this is beginning treatment rather early, since many perfectly healthy men have a diastolic pressure of 80 and this pressure can be considered normal. He adds that if after an injection of saline solution the pressure does not rise it is essential that adrenalin be given in the next injection, and points out that the adrenalin in solution of 1:1000 should be kept in a stoppered flask in the dark, and that solutions which are not colorless should be rejected. At the moment of injection 0.5 Cc. of adrenalin solution in 50 Cc. of normal saline solution at 38° C. should be used. The injection should be given slowly and should be stopped if the heart becomes irregular in its action.

It is interesting to note that the practical application of these advices seems to have produced excellent results amongst French soldiers who have been wounded.

One other factor we are surprised to find is not considered, namely, the administration of atropine, which undoubtedly tends to contract the blood-vessels in the splanchnic area and restore circulatory equilibrium. Atropine has been shown by the writer, and many others, to be an efficient protective agent against shock and vascular collapse arising from the use of chloroform. If used by hypodermic needle in a case of shock it must be given deeply into the belly

or a muscle, or in a very dilute solution intravenously, since in vascular collapse there is no absorption from the subcutaneous tissues. As atropine, although an active drug, almost never produces lethal poisoning, there is no danger in its use and it should be employed fearlessly, as much as 1/75 or even 1/50 of a grain or more in severe cases.

PHOSPHATE RETENTION AND ACIDOSIS.

We have, on a number of occasions during the last two years, taken pains to inform our readers of some of the more recent investigations which have been made upon the important subject of acidosis. It is not many years since this state was almost unknown to the profession, and what little we knew of it dealt with the so-called acidosis of diabetes in its more advanced forms. Some time ago we called attention to the fact, known already to many others, not only that all conditions which induce starvation are prone to result in acidosis, but that this condition may be the chief cause for the stupor and the death of children suffering from acute or subacute gastrointestinal disorders, notably infantile diarrhea.

It is becoming increasingly evident that there are other forms of acidosis than that which is typical in diabetes mellitus, and which is dependent upon the presence of beta-oxybutyric acid or diacetic acid. This evidence is based upon the fact that methods employed for the relief of the well-recognized forms of acidosis fail in certain patients and upon various laboratory investigations which indicate that all acidosis is not due to beta-oxybutyric acid or its e ducts. In nephritis, when the disease is far advanced, a large part of the dyspnea from which the patient suffers is probably due to a form of acidosis, and an examination of these patients will show, as has been recently pointed out by Marriott and Howland, a diminished carbon dioxide tension of the alveolar air, an increased hydrogen ion concentration of the blood or serum, a

diminution of the alkali reserve, and of the ability of the hemoglobin to combine with oxygen.

Marriott and Howland think that a reasonable explanation for the acidosis is that the kidneys fail to play their part in excreting the acid substances ordinarily formed, for healthy kidneys maintain the acid basis equilibrium of the body by their ability to excrete phosphates. Marriott has therefore devised a method whereby he believes he is able to accurately and delicately determine the inorganic phosphates in a small quantity of serum. The results seem to indicate that inorganic phosphates, as expressed in terms of phosphorus, should be normally from 1 to 3.5 mg. per 100 Cc. of blood, the great majority of patients presenting a quantity less than 2 mg. In severe cases of nephritis there is a tendency of the inorganic phosphates to be slightly increased, but they admit that in some instances death from nephritis occurred without increase in the phosphates and without any increase of acidosis. In those nephritic patients, however, who presented evidences of acidosis, manifested chiefly by dyspnea, there was in every instance an increase in the inorganic phosphates, as indicated in terms of phosphorus often varying from 8 to 23 mg. per 100 Cc. of blood, and they believe that the retention of acid phosphate is responsible for the symptoms in these cases, although they are not confident that it is the sole factor. Such a retention of acid phosphate is not necessarily a part of general salt retention on the part of the kidney, but is apparently due to the fact that the particular function of the kidney which is concerned with the elimination of acid phosphate is impaired.

While it is true that this acidosis may be temporarily combated or overcome by the free administration of alkalies, it is also unfortunately true that the symptoms are not materially modified, and the use of bicarbonate of sodium fails to bring about the desired reduction of the accumulated phosphate. Marriott and Howland also think that the retention of acid phosphate has a definite influence upon osmotic pres-

sure, and that this may be a factor in the development of edema. As yet they are unable to advance any method which will successfully combat this acidosis so far as acid phosphate is concerned except by indirect means. Most of the cases which they investigated, while showing on the one hand a greatly increased quantity of acid phosphate in the blood, showed that the calcium of the blood had been greatly reduced, being only about one-tenth of the normal quantity. For this reason they think that the administration of calcium salt may lead to increased elimination of phosphate and replace some of the calcium which the blood lacks.

THE DUCTLESS GLANDS.

The constantly accumulating evidence which indicates that the ductless glands are closely interlocking in their function increases rather than diminishes the intense interest which we feel in this comparatively new field of physiology and clinical medicine. It would seem that there still remain functions and glands to be more thoroughly investigated which in their investigation will throw a flood of light upon many functions of the body which heretofore have been but little understood.

All too frequently the laboratory investigator falls into the habit of considering his results as belonging to the realm of abstract science and cares little for the practical application of the results which he achieves. A notable exception to this is found in the work and contributions of Cannon of Boston, who is broad enough in his view to see that the real interest in such investigations is due to the light which they may pour upon the study of human beings in various conditions of disease. In a recent issue of the *Journal of the American Medical Association* he reiterates, what he has so clearly stated before, that when there is great excitement the suprarenal glands secrete adrenalin which in turn acts as a key which liberates sugar from the liver, resulting in an increased quantity of this

substance in the blood, and from this increased quantity the muscles, which are utilized in the escape of the individual, animal or man, from danger, are provided with a flood of nutritional material. Furthermore, the excess in the secretion of adrenalin results in a redistribution of the blood, so that it leaves the digestive apparatus, whose functions are temporarily inhibited, and is largely confined in its circulation to the heart, the lungs, the central nervous system, and the muscles. At the same time it dilates the bronchioles and increases the number of red blood cells and thereby permits air to enter the vesicles of the lungs more readily and enables the blood to carry oxygen in greater quantity.

Many of these investigations seem to us not only pregnant with possibilities in regard to the use of the glands themselves, but also to open up new fields for therapeutic investigation. It is not only possible but likely that certain remedies, which have been found very useful by clinicians, may act indirectly by changing the activities of the glands of internal secretion. Thus, in pneumonia and other conditions in which the respiration may be seriously impaired, it is possible that the suprarenal bodies, recognizing the demand on the part of the respiratory muscles for a full supply of sugar, may secrete an increased quantity of adrenalin and thereby enable these muscles to carry on vigorous movements for many hours. Every practitioner of experience can look back over his career and remember cases in which children and adults have breathed at the rate of 40 or 60 times a minute, hour after hour, without apparently suffering as great a degree of exhaustion as would be expected. Any one who will stand by the side of such a patient and try to breathe as rapidly will find that before two minutes have elapsed he is rapidly becoming exhausted, but in the healthy individual there is no demand on the suprarenal bodies for an increased secretion of adrenalin, whereas in the patient whose life depends upon rapid respirations and whose central nervous system may recognize danger, a condition arises which is closely akin

to that in which an excess of adrenalin is secreted in an animal which, suffering from fright, endeavors to escape from an enemy which may be pursuing him. It may be that many drugs of high repute do not act directly as stimulants to the heart or respiratory center, but upon glands which in turn affect these vital parts.

CROUPOUS PNEUMONIA AND ITS TREATMENT.

Much of the confusion which has arisen in the minds of physicians as to the prognosis and treatment of croupous pneumonia has been due to the fact that diagnosis has heretofore been purely empirical, except that in some instances the bacteriologist made the report that the sputum did not contain pneumococci. Not rarely the physician would be called to two cases of pneumonia on the same day, each of them in the same stage of the disease and at the same period of life, and neither of them suffering from a primary disease which placed the attack of pneumonia in the class of terminal infections, yet, with exactly the same plan of treatment, or with no treatment at all, save rest in bed, one case proceeded to a prompt recovery and the other proceeded to an even more speedy death. In those instances in which diabetes, nephritis, or other maladies which impair vital resistance have been present prior to the pneumonic attack such a result is not really puzzling, but where these predisposing causes of fatality are absent, it has been difficult to reach a satisfactory explanation.

Within comparatively recent months the explanation is, however, becoming more and more clear, since the bacteriologist is now able to differentiate at least four different types of the pneumococcus, No. 1 and No. 3 being particularly virulent, whereas No. 4 has a low degree of virulence and, as statistics show, comparatively rarely causes death. Fortunately it seems possible to produce an antipneumococcic serum for No. 1 and No. 3, but no antipneumococcic serum for No. 4. This antipneumococcic

serum has been tried by a number of clinicians and has given results which encourage its further employment. The great difficulty is that physicians are loth to resort to it in many instances until the patient is gravely ill, when the serum cannot be expected to rally or benefit a moribund patient. A more important difficulty, because it is not avoidable, is the necessity of employing a serum identical in its derivation to the microorganism which is causing the illness, for it would seem that there is no use in administering an antitoxic serum made through the agency of type No. 1 when the illness is due to type No. 2 or No. 3. This, in turn, requires that the bacteriologist shall not only determine that a pneumococcus is present, but that a number of days will be lost while he is determining its type, and by the time that he has made this determination the patient is too ill to be benefited by the use of the antitoxic serum. This factor alone greatly militates against the successful employment of this method of treatment and, at the present time, bids fair to prevent its use in so many cases that antipneumococcic serum cannot be widely and successfully employed.

The fact that bacteriologists can differentiate between the different forms of pneumococcus has, however, an important bearing upon other lines of therapeutic procedure. Heretofore when a certain line of treatment has seemed to give the physician excellent results in one case but has utterly failed in another, he has been at a loss to explain the difference in his results; whereas if, after a certain number of days, the bacteriologist reports to him that the recovery which followed his treatment occurred in a case of infection with pneumococcus No. 4, and that the death which followed his treatment occurred in a case of infection with pneumococcus No. 3, he will at once perceive that the odds were greatly against any efforts that he might make in the case of the patient who had a fatal termination, and this information enables him to more accurately gauge the correctness of his previous therapeutic observations.

RECURRENCE OF GALL-STONES.

The concept held universally by surgeons, one with which the internists are not entirely in accord, to the effect that disease of the biliary passage is essentially surgical, is advanced with unusual force by Deaver (*American Journal of Surgery*, February, 1917) in an analysis of upwards of 2000 cases of gall-stone disease, the study being designed primarily for the purpose of discovering the cause or causes of recurrence of biliary colic. A failure to remove all the gall-stones at the primary operation is he believes the most potent cause of recurrence of symptoms, and this failure is to a large extent, if not entirely, due to procrastination upon the part of the patient, encouraged by the physician, the recurring attacks being treated conservatively and the patients being subjected to a great variety of treatments, which, though doubtless of temporary benefit, have no curative effect upon the underlying lesion. During this conservative treatment the gall-ducts become dilated and the stones are apt to lodge in recesses, so that they cannot always be removed or even detected at operation.

Kehr holds that operation may be postponed for a few weeks or months when the inflammation is limited to the gall-bladder, but in cholangitis it should be resorted to after a second attack before the ducts have had a chance to dilate. He notes that the surgeon who gets a chance to perform an early cholecystectomy and drains the widely incised choledochus is only rarely confronted with a recurrent case.

Deaver believes that free and prolonged drainage of the gall-bladder or the common duct is the best means of overcoming recurrence, and makes it a practice to use large-sized tubes and allow them to remain *in situ* until they practically drop out. It is not always easy to determine whether the recurrent stones are overlooked at operation or whether they are formed again after operation. The impression is strong that reformation has taken place, inasmuch as the number of stones in many of the cases again operated on ranged from five or six

to several hundred, which could hardly have escaped detection.

On the other hand, it is not always possible to clear the two primary branches of the hepatic duct. Some cases require several operations before permanent cure can be accomplished. There should be no hesitation in opening the common or hepatic duct to secure it. Other cases show renewed infection of the gall-bladder or the bile ducts. Failure to remove all infection at the primary operation is indicated by the presence of acute or chronic cholecystitis, chronic cholangitis, biliary cirrhosis, and pancreatitis at the subsequent intervention. Some of the less common causes of recurrence are obstruction at the papilla of Vater, biliary fistulas, internal and external, and interstitial pancreatitis and pancreatic lymphangitis.

Biliary cirrhosis may be associated with numerous minute stones in the common, the hepatic, and the smaller bile ducts, with occlusion of the papilla of Vater. For the relief of this condition only prolonged gall-bladder or common-duct drainage will suffice to bring about a permanent improvement or cure.

Chronic cholangitis must be reckoned with in the study of the causes of recurrence. Deaver has one patient wearing a T-tube now over three years, who is perfectly well and will not listen to removal of the tube, although he has had two previous operations. A number of his patients are wearing these tubes upon whom he has performed the second or third operation; all of these patients are doing their work as they did before being attacked. In this class of cases in which the gall-bladder can be left drainage by this viscus is the best and safest method. Although the aseptic formation of the radial cholesterine stones in the gall-bladder may occur in the absence of bacteria, all other gall-stones, the complex ones and the cholesterine-pigmented calcium stones, owe their origin to infection and obstruction.

Deaver quotes the words of Moynihan in reference to every gall-stone—"a tombstone erected to the memory of the bacterium

which lies dead within." Murphy states that the cholesterine, which forms 98 per cent of all gall-stones, is the product of dead epithelial cells. The stones by their presence in a more or less infected zone cause a continual deposit of cholesterine, which thus continually increases the number of stones "until finally there is the arrest of the microörganism of a more virulent type, which starts suppuration in the gall-bladder."

If infection be distributed over a great area of mucous surface there will result a large number of gall-stones. Deaver regards the appendix as the focus of infection for nearly all upper abdominal diseases, the gall-bladder affections, gastric and duodenal ulcer, pancreatitis, etc. This implies the removal of even a slightly troublesome appendix in order to avoid future trouble. The fact that 95 per cent of primary and only 15 per cent of secondary carcinomas of the gall-bladder are associated with gall-stones indicates that gall-stones are the cause and not the result of carcinomatous degeneration. Further pernicious results of neglected gall-stones are seen in myocarditis and kidney degeneration, as well as degeneration of the blood-vessels, diabetes, hematogenous infection, etc.

Although it does not deal directly with this phase of the subject Deaver's paper indicates that cholecystectomy is the operation to be chosen rather than cholecystotomy.

THE TREATMENT OF TETANUS.

Among the therapeutic victories of the present war has been recorded, and with some justice, the control of tetanus as a sequel to mixed infection, by prophylactic injections. As to the value of these and their general efficacy all are agreed, but there is some difference of opinion as to the dosage.

Concerning the treatment of the disease once developed—and many cases have developed in spite of these prophylactic injections—there is a wide divergence of opinion, nor can it be said that the treat-

ment of tetanus is more thoroughly formulated than it was two years ago. This in spite of the enormous experience which the present conflict has enabled surgeons to acquire.

Leishman and Smallman (*Lancet*, Jan. 27, 1917) have made a study of 160 cases of tetanus which occurred in the hospital in France in eight months. Of these 118 died and 42 recovered, a case mortality of 73.7 per cent. This mortality can be contrasted with the previous group examined in the spring of 1915. In that series, among 179 cases there were 140 deaths, a case mortality of 78.2 per cent. Both series show a heavier mortality than that which has been recorded in home hospitals. In the first year, out of 231 cases analyzed by Sir David Bruce, there was a case mortality of 57.7 per cent, and for the second year, up to July 31, 1916, out of 195 cases a mortality of 49.2 per cent.

These four series show a slight improvement in case mortality on each side of the Channel, but also make it clear that cases are more fatal in France by about 25 per cent. The causes for the latter fact are incident to the class of cases; so desperately wounded that they are not able to be transported, and usually with serious complications such as sepsis and gas gangrene. The authors believe the highest incidence of tetanus occurs in wet weather. Among the fatal cases a large per cent exhibited extensive and severe wounds, and over 61 per cent were complicated by gas gangrene, over 78 per cent by severe sepsis. The percentage of these complications was much lower in the cases which recovered.

The average incubation period of all the cases was something over twelve days. Of the fatal cases, 115 in number, the average period was 10.7 days, and of the 42 recoveries it was 14 days. The shortest period of incubation was two days, the longest 90 days. It is worthy of note that the two cases of long incubation, respectively 52 days and 90 days, both resulted fatally.

As regards delayed tetanus, it is to be presumed that spores remain undestroyed in the tissues till they are in some way

stimulated to germination. There were 13 cases in the series in which the disease did not make its appearance until 21 days or more had elapsed. This may be assumed to be the limit of the normal incubation period. Of these 13 cases, 8 died and 5 recovered.

As to the influence of operation after tetanus declares itself, the practice seems to be decadent because of the heavy mortality dependent upon it. Of nine cases seven died.

As to prophylactic injections, it is well known that the earlier the preventive dose is given after the receipt of the wound the more likely is it to be of use, but since there is little positive information as to the effect of delay an effort was made to obtain precise details as to the number of hours which had elapsed between wound and injection. This was done in 66 of the 160 cases. Of the 43 cases which received within twenty-four hours a preventive dose of 500 or more units—less is never given—62.7 per cent were fatal and 37.2 recovered. Of 23 cases in which the giving of the antitoxin was for one reason or another delayed beyond twenty-four hours, 86.9 per cent died and only 13 per cent recovered. It is true that delay implies a period of neglect incident to war conditions, which in itself implies increased mortality. It was shown in this comparatively small number of cases that the incubation period was increased by prophylactic dose in those who recovered, even when the dose was delayed. No prophylactic dose was given in 15 of the cases, and 9 of these died—i.e., 60 per cent. It should be noted that of the six who recovered, five were instances of men whose injuries, being of the nature of scratches or abrasions, were so slight that they did not report sick, and hence they did not receive any dose of serum. Others who received serum were of that unlucky class who were picked up some days after the injury.

As to the therapeutic use of tetanus antitoxin, the authors mention that there are no fewer than 15 possible combinations of the four routes by which this may be given.

There are instances of each of these combinations having been employed.

Those in whom the total dosage had been below 20,000 units comprise 116 cases, of whom 91 died, a case mortality of 78.4 per cent. The remaining 41 cases received more than 20,000 units, and of these 24 died, a case mortality of 58.5 per cent. There is, therefore, a balance of 24 per cent in favor of the larger dosage.

In the cases treated in home hospitals it is noted that of the 175 cases therein analyzed into similar groups, below and above a total dosage of 20,000 units, we find that of 108 cases in the small-dose category 61 died, a case mortality of 56.4 per cent, while of the 67 cases in the large-dose class only 21 died, a mortality of 31.3 per cent; the balance here being in favor of the larger total dosage. These figures apparently prove the value of a full dosage.

As to the route of administration, the highest mortality was followed by the intrathecal one. This corresponds with Bruce's figures. The authors feel that their study, combined with that of Bruce, throws very considerable doubt upon the advisability of employing the intrathecal route, either alone or in combination, and further, it seems to indicate considerable virtues in connection with the employment of the subcutaneous and intramuscular channels, particularly the latter. In placing the choice of the intravenous route last, they state that they are in full agreement with the recommendation of the Tetanus Committee in their revised Memorandum, that this route should not be used. It introduces the possible element of anaphylactic shock and has done little if any good.

As to the intrathecal route, they are not inclined to support the recommendations contained in the Memorandum just mentioned when it says: "In a case of tetanus the first thing to do is to give an intrathecal injection of antitoxin." Bruce regards the evidence for and against it as not conclusive. The hope, in making the intrathecal injection, is that by bringing antitoxin into the cord we may effect a dissociation between the cell and the molecules of toxin.

If the intrathecal route is used not more than 10 Cc. of cerebrospinal fluid should be withdrawn and should not be replaced by a greater volume of antitoxin. They believe that the subcutaneous and intramuscular routes should be the ones employed.

Turning to the question of dosage this appears a most difficult matter to judge. Recovery will follow where the dose has been ludicrously small; others have died in spite of enormous dosage. The proper quantity to give must be a matter of surmise. If the combined subcutaneous and intramuscular routes be used, the daily dosage for the first few days should not fall below 10,000 units. The specific treatment should be commenced at the earliest possible moment and should be maintained effectively well into convalescence. With the recommendation of the Committee of repeating the initial prophylactic injection of antitoxin every six or seven days as long as there is any reason to fear tetanus, the authors are in full accord. Moreover, they

agree that a preventive dose should be given prior to any secondary operation. For the reasons given above they think that it would be well to give such a dose by the combined subcutaneous and intramuscular channels, inoculating it at several points around the site of operation and at different depths of muscle on its proximal side. If time permitted this should be commenced forty-eight hours before the operation, but if the operation was one of urgency similar injections in the neighborhood of the operation wound, with perhaps injection into the sheaths of prominent nerves, would appear a wise routine procedure. Fifteen hundred units will be a suitable amount to give.

Carbolic acid treatment has been practically abandoned, as has magnesium sulphate. Sedative drugs have been used in the great majority of cases. In order of frequency these were as follows: Chloral, bromide, morphine, chloretone, atropine, omnopon, scopolamine, alcohol, chloroform, and paraldehyde.

REPORTS ON THERAPEUTIC PROGRESS.

OBSERVATIONS ON THE TREATMENT OF CEREBROSPINAL FEVER.

In the *British Medical Journal* of November 18, 1916, WORSTER-DROUGHT well says that as a definite line of treatment in cerebrospinal fever (meningococcal meningitis) is as yet not satisfactorily determined, methods of considerable diversity being still employed by different observers, any record of a number of consecutive cases treated by a particular method may be of some value in the ultimate elucidation of the best means to combat the disease. There is still much difference of opinion as to whether serum is or is not of any efficacy, whether cases are best treated by lumbar puncture alone, or if vaccines assist in contributing toward a successful issue.

The average mortality in epidemics of cerebrospinal fever from 1904 to 1905 was 80 per cent. In 1913 Flexner published a summary of 1294 cases treated with the

serum bearing his name and yielding a mortality of only 30 per cent. Unfortunately, however, the cases occurring in England from the end of 1914 onward did not apparently show the good results with serum that were expected. In the cases occurring at Royal Naval depots (1914-15) the mortality of serum-treated cases was 64 per cent, but in many instances the serum treatment was not commenced until late in the disease, often the fourth to the seventh day, sometimes even later. The doses, also, in certain cases were quite inadequate. In the report of the Medical Research Committee on cerebrospinal fever (1916), the majority of reporters seemed unable to decide how much benefit accrued from serum and how much from the associated lumbar puncture. The average mortality appears to have been as high as 59 per cent in the serum-treated cases mentioned in this report. More recently, however, F. W. Andrews, using

Lister Institute serum (1916) on 11 consecutive cases, had a mortality of four—that is, 36.36 per cent; two of the fatal cases were under a year old.

On the other hand, Gaskell and Foster treated 30 cases of cerebrospinal fever by frequent lumbar puncture alone; their mortality was 30 per cent. Morgan in 1908 had a mortality of 44 per cent in 18 cases treated in the same manner.

During 1915 vaccines were frequently employed concurrently with other methods of treatment. The few cases referred to by Rolleston in which vaccine was used, many of which Worster-Drought had the opportunity of observing, gave an apparent mortality of only 25 per cent. Most of these cases, however, were well on the way to recovery before the vaccine was given; they were also, in addition to lumbar puncture, treated with either serum or soamin. Of other observers, Warren Crowe considered that autogenous vaccines did good in influencing temperature. He commenced with the very small dose of one million organisms, while Walker Hall gave a polyvalent vaccine every two days in gradually increasing doses from 25 to 500 million, preferring it to serum. J. R. Collins recommended starting with a half to one million organisms, and is of the opinion that it does good, especially in chronic cases. T. J. Horder also quotes a case of Garrod's in which vaccine certainly appeared to benefit a case running rather a prolonged course. Sophian has further demonstrated antibodies in the blood of persons injected with vaccines. Among other authors there is considerable doubt existing as to the relative value of vaccines. Worster-Drought's own experiences in 1915 left him with the distinct impression that vaccines were of material assistance once cases had passed the initial acute stage and were full worthy of a further trial. The series of cases here dealt with, therefore, have been treated by the combined method of serum administered intrathecally and vaccine subcutaneously.

The one fact on which the majority of observers are agreed is that the chemical substances hitherto employed—for example,

soamin, protargol, lysol, etc.—are of no value in influencing the disease. Certainly this was Worster-Drought's conclusion with regard to soamin in 1915. Recently Flexner and Amoss have further shown that lysol and protargol have no effect upon meningitis in guinea-pigs or monkeys, and moreover, being antiphagocytic, do more harm than good.

In estimating the value of any particular form of serum treatment it is essential to know the day of the disease on which the treatment was commenced, the exact dosage, and also the frequency with which the serum was given. It is unfair both to the serum and the physician to state in a statistical report that the mortality of serum treated cases was such and such a number when the serum injection has not been commenced until the fifth or sixth day, the dose has varied from 5 Cc. to 40 Cc., and the frequency of administration from twice a day to once a week.

All observers emphasize the supreme importance of early treatment. All have found that the earlier treatment is begun the better are the results.

When first performing lumbar puncture on a suspected case, if the fluid shows any turbidity, it is advisable to administer serum at once without waiting for the bacteriological examination. This, as far as possible, has invariably been Worster-Drought's practice; valuable time is saved, and no harm can be done by the serum to a possible case of pneumococcal or tuberculous meningitis. A similar procedure was also followed by Pignot and Terrasse at the French front with good results.

The serum used in Worster-Drought's cases was the Lister Institute polyvalent serum (1916), prepared from the various strains of last year's epidemic. The summary of the treatment adopted is as follows: Serum is given at the earliest possible moment, as stated previously, without waiting for the bacteriological report. The initial dose is 30 Cc. This amount is repeated daily until the clinical improvement is quite definite and undeniable; the bacteriological findings are inclined to be mis-

leading if relied upon solely, as clinical symptoms are often well marked when organisms can neither be seen nor cultivated. The minimum period for continuance of serum is four days, thus covering the merely apparent improvement so often seen on the second or third day. This practice is also strongly advised by Netter, no matter how great the improvement may appear. The dose is always 30 Cc., excepting when less than this amount of cerebrospinal fluid can be obtained; in such a case the fluid withdrawn should exceed the amount of serum injected by at least 5 Cc. When the clinical improvement is quite decided, serum may be omitted; lumbar puncture is then performed daily until the fluid is clear to the naked eye. Should there be any sign of the reappearance of symptoms, particularly mental relapse or increased turbidity of fluid, serum administration is recommenced and continued on the same lines. The amount of fluid withdrawn is always practically the maximum that can be obtained—that is, until it flows through the needle at about the rate of one drop in five seconds. He has never seen the slightest misadventure follow this evacuation, not only in the present series of cases, but in many others treated by various methods.

There is some difference of opinion concerning the advisability of a general anesthetic for the performance of lumbar puncture. Horder, Robb, Gaskell, and Foster regard anesthesia as infinitely preferable. The latter authors give two reasons: (1) Necessary in delirium; (2) danger of breaking a needle. Having performed some hundreds of punctures in routine neurological work, including out-patient departments, Worster-Drought does not consider an anesthetic at all necessary as a general rule. It is essential in tetanus, but in cerebrospinal meningitis he has only used anesthesia four or five times when the patients have been very violent. Provided one has an assistant with a thorough knowledge of the requisite position in which to hold the patient, the operation is performed without difficulty, always allowing moderate skill on

the part of the operator. Two patients suspected of being mild cases of cerebrospinal fever were admitted, having been punctured elsewhere under general anesthesia. When the operation was performed without an anesthetic, they stated afterward that they much preferred it thus, not being troubled by the subsequent vomiting. Further, an anesthetic requires two medical officers instead of one, it occupies more time, and when given daily there is a risk of its considerably interfering with feeding. As regards the second point mentioned above, that of breaking the needle, he can only say that, so far, he has had the good fortune to escape this calamity.

The serum is much better run in by the gravitation method than injected by means of a syringe. However slowly the serum is forced in with a syringe, there is a risk of respiratory failure occurring from a sudden increase of intracranial pressure. This he has seen occur, the patient only being brought round with extreme difficulty. In some 400 injections with a funnel and tube, including the administration of salvarsanized serum and tetanus antitoxin, he has never seen any indication of collapse or the slightest bad result. It seems unnecessary, therefore, to take the further precaution, advocated by Sophian, of registering the blood-pressure as an ocular guide to injection by gravity.

THE TREATMENT OF INFANTILE PARALYSIS.

In the *New York Medical Journal* of November 25, 1916, FRAUENTHAL states that he wishes to call attention to a class of active and passive exercises done before a mirror, having the patient concentrate his mind on the affected muscles. When the origin and insertion of the muscles cannot be approximated by an effort of the will, the attendant aids in the effort.

After a time, however, it is found that the motion may be brought under control of the will. It is known that when motion is guided by mental concentration, the sulci in the gray convolutions in the brain, presiding

over this motion area, are increased as well as the caliber of the nerve going from the cortex to the periphery. It has been demonstrated by Anderson, of Yale, and others, that when a person is securely placed on a body balance and concentrates his mind on an extremity, the hyperemia thus produced tips the body balance in the direction of the limb.

A moment's thought makes clear the fact that the nerve efficiency or nerve control, as displayed by the gyrations of the nautch dancer, can be developed by any person in any set of muscles if a proper effort is made. The stimulus transmitted from the brain to the periphery depends on the caliber of the conducting nerves, as the diameter of copper wire regulates the volume of electric current capable of transmission. We must realize that the concentration of the mind on the muscular effort not only initiates the movements, but also sends blood to the controlling nerve centers, producing growth and development in the conducting filaments.

In this treatment of infantile paralysis, in addition to the application of massage and treatment by galvanic, faradic, sinusoidal, and high-frequency current, in children over three years of age a course of muscle education before a mirror is added, which Frauenthal regards as one of the most important, because recovery is best brought about by the action of the will, influencing action after massage and electricity have brought the muscles under the control of the mind.

The muscles most frequently involved in infantile paralysis are the peroneal group, and the plan of exercising one set of muscles can be utilized in another set of muscles involved. Placing the child in a chair before the mirror in a comfortable position, Frauenthal first approximates the origin and insertion of this muscle group by bringing the foot up to a right angle with the leg, and then urges the child to aid in bringing up the little toe side of the foot through an arc of about 30°. If the muscle contraction is such that the child cannot do this alone, the instructor places one hand on the knee to keep the leg in position, and places the

other hand under the foot, which greatly aids the efforts of the child to produce the required contraction. This should be repeated several times, but not the point of overtiring the weakened muscles. Each set of muscles should be contracted in a similar manner. If the motion cannot be brought about, the mental effort should still be made for the attainment of this action.

THE AFTER-TREATMENT OF INFANTILE PARALYSIS.

SAYRE states in the *New York Medical Journal* of November 25, 1916, that in talipes calcaneus the operation devised by Whitman has given most excellent results. The astragalus is removed; a thin section of bone is then cut from the outer surface of the os calcis and cuboid. On the inner side the sustentaculum tali is cut away and the calcaneonavicular ligament is partially separated from its attachments. The cartilage is then removed from the two malleoli, and if necessary they are reshaped to permit accurate adjustment. The foot is then displaced backward as far as possible so that the external malleolus may cover the calcaneocuboid junction, while the inner malleolus is forced into the depression behind the navicular. The peronei tendons which were divided at the first stage of the operation are then attached to the insertion of the tendo Achillis and to the os calcis by strong silk sutures. The object of the removal of the astragalus is to assure stability and to prevent lateral deformity by placing the leg bones directly on the foot. The object of the backward displacement of the foot is to direct the weight upon its center and thus remove the adverse leverage which induces dorsal flexion.

In cases of flail knee, arthrodesis has been advised, and in selected cases is undoubtedly a useful operation. It has various objections, however, which do not hold good in the case of the ankle. A patient with a stiff knee is much hampered in sitting down, and in the majority of operations is more comfortable when supplied with an apparatus which allows flexion

while sitting down than if the leg is held rigidly in extension all the time. The operation is advocated by some on the grounds that it is too expensive for a poor man to use a splint, but it seems to Sayre that this position is illogical. If a man's joint is resected, he is incapacitated from work for a period of three months. Supposing he earns ten dollars a week; this is a loss of one hundred and twenty dollars. The cost of his support in any hospital during this period would be two dollars a day, in a great many hospitals a larger sum. This will make one hundred and eighty dollars. The cost of the surgeon's time during the operation should be taken into account, as it is fair to presume that even if we make no charge for the operation—it being done in the hospital—nevertheless the time consumed might be put to a profitable account elsewhere by the surgeon, so let us charge twenty dollars for the surgeon's time, making three hundred and twenty dollars in all. This sum invested at 4.5 per cent would bring in fourteen dollars and forty cents per annum, more than enough to purchase the original splint and keep it in repair during the patient's life. Sayre believes that many operations which are advocated on the grounds of economy are really more costly than conservative measures if we examine the situation with care. Provided that an operation is to be done on the knee, obviously it should be deferred until after the cessation of bone growth, as early resections of the knee are apt to result in great permanent shortening from the interference with the epiphyseal cartilage. In the hip, when the gluteal muscles are completely paralyzed, it may be wise to perform an arthrodesis, cutting off the upper edge of the femoral head and gouging out the acetabulum, thus allowing two raw bony surfaces to come in contact and so form a secure union, as suggested by Albee in painful arthritic conditions. Here again the question of the usefulness of an ankyloid hip must be considered.

These cases of gluteal paralysis give the most difficult problems with which we have

to deal, and present the most unfavorable prognosis.

Many patients walk quite well who have almost no power in the quadriceps femoris but have a well-balanced knee-joint, but the patient with paralyzed glutei is in most unstable equilibrium and can rarely do without apparatus if the paralysis is bilateral.

To summarize the treatment, Sayre would say: Do not do too much at first; give the patient absolute rest for many weeks. Prevent deformities by opposing contracting muscles. Later on, use gentle massage movements, active, passive, and restrictive. Endeavor to reestablish the path of nerve control to the muscle. Aid this by electric stimulation in suitable cases. If necessary, employ support to prevent undue stretching of muscles, or ligaments, or deformity of bones. Later on, if deformities have developed, do such surgical operation as may be necessary to put the skeleton in a position best to support weight, and to balance the opposing force of muscles so as to preserve equilibrium. By these means many patients who otherwise would be hopelessly bedridden will be enabled to go about in comparative comfort.

● TREATMENT OF GOUT.

CHACE in the *New York State Journal of Medicine* for November, 1916, reminds us that whether uric-acid retention is the cause of gout or is an index of the retention of some unknown substance which is the etiological factor is only of academic interest. The important point for the internist is that the improvement in the condition of the patient is accompanied by a corresponding reduction of the uric acid in the blood.

The aim of treatment is twofold: first, to prevent the formation of uric acid, and secondly, to facilitate its elimination.

Patients with a gouty tendency should avoid a sedentary life and should take light exercise, such as golf, walking, horseback riding, and indoor gymnastics. The skin and muscles should be kept in a healthy condition by massage, baths with friction rubs, and an occasional Turkish bath.

The dietetic treatment of gout is based upon the estimation of the patient's ability to eliminate exogenous uric acid, his endogenous excretion of uric acid having been previously determined.

The purin-free diet given in the table below has been found useful for this purpose. After the patient has been on this diet for three days fairly constant values for endogenous uric acid are obtained. The amount of uric acid above this figure found in the urine when the patient is taking purin is exogenous. A persistent daily output of less than .35 mg. of endogenous uric acid establishes a diagnosis of gout.

Purin-free Diet.

Breakfast: Apple or banana, cream of wheat or farina, with cream and sugar, one egg, cup of cereal coffee with cream and sugar, toast with butter.

Dinner: One egg, baked potato with butter, string-beans, rice or macaroni, baked apple with sugar, glass of milk.

Supper: Rice with butter, cream cheese, bread with butter, stewed pears or rice pudding.

Following the suggestion of Von Noorden the uric-acid-forming possibilities of various meats are given in the following table:

Accessory Diet with Articles of Food with Known Uric Acid Equivalents.

100 g. roast meat (beef, veal, lamb, pork, mutton, or ham).
100 g. salmon.
70 g. beefsteak or veal cutlet.
200 g. fish, lobster, or crab.
2 dozen oysters.
1 spring chicken.
75 g. lentils.
155 g. spinach.
200 g. peas or beans.

One hundred grammes of lean roast beef produces .14 mg. of uric acid, of which approximately 50 per cent is excreted, respectively, in the urine and feces. By determining, according to the suggestion of Von Noorden, the eliminative capacity of the body for exogenous uric acid, it is possible to keep the daily intake of purins well within this limit. On the other hand, Umber has advised determining the number of days required to eliminate the uric acid arising from a definite amount of purin substances and limiting the ingestion of such substances to intervals which prevent the retention of uric acid. This method emphasizes the importance of interspersing purin-free

days in the diet so as to insure the complete elimination of exogenous uric acid. As these procedures necessitate the accurate collection of twenty-four-hour specimens of urine and the careful estimation of the uric-acid content of specific diets, they have proved cumbersome and are being superseded by the simpler procedure of examining the blood for uric acid. The amount of uric acid reduction in the blood obtained by placing the patient upon a purin-free diet is shown in the following table:

Effect of Diet and Drugs on Blood Uric Acid—Illustrative Cases.

	T. B. GOUT.		H. L. GOUT.		G. C. GOUT.		F. S. HYSTERIA.	
	Before.	After.	Before.	After.	Before.	After.	Before.	After.
Purin food.....	8.3	5.5	6.4	8.5	5.5	6.3	..	..
Salicylates.....	4.4	1.4	..	..	..	..	4.0	0.8
Atophan.....	4.4	2.5	..	..	..	..	..	..
Saloxyl.....	..	..	..	..	5.5	2.4	..	..
Radium.....	4.0	4.1	..	..	..	..	..	..
Colchicum.....	4.4	4.4	..	..	..	..	4.0	3.5
Quinine.....	..	..	..	..	..	..	4.1	5.0
Diuretin.....	4.4	5.3	..	..	..	..	4.0	4.1

In the dietetic management of gout the uric acid content of the blood should be determined with the patient on a mixed diet, then the amount that this figure can be reduced by a purin-free diet should be ascertained. By this procedure a reduction of .2 mg. of uric acid per 100 Cc. of blood is frequently noted. To obtain a constant figure the blood should be taken before breakfast. By the careful addition of small amounts of purin to the diet the patient's tolerance for uric acid can be determined.

In prescribing a permanent diet it is well to keep the purins within the patient's eliminative capacity and to interpose purin-free days at frequent intervals.

The best results are obtained by giving a well-balanced diet, particular care being taken to maintain the patient's strength. An excess of carbohydrates results in glycosuria, while too large an amount of fats induces obesity, which places too great a strain upon the heart and arteries. An initial condition of obesity should likewise be corrected. For a patient weighing 150 pounds a daily intake of 70 grammes of protein, derived largely from vegetables, 200 grammes of carbohydrates, and 150

grammes of fat, yielding approximately 2500 calories, is necessary to maintain bodily vigor. As the uric-acid-forming possibilities of red and white meats as well as of fish are identical no distinction need be made. Boiled meats contain less of the precursors of uric acid than those which have been basted.

The intake of sodium chloride is limited because sodium salts favor the deposition of urates in the tissues. Coffee, tea, and cocoa, owing to their purin content, should be used sparingly, if at all. Alcohol in any form interferes with the elimination of uric acid. The condiments irritate the kidney in the process of elimination and should be avoided. It is well known that strawberries, oranges, bananas, cucumbers, and tomatoes intensify the symptoms of gout. Water is one of the best eliminants of uric acid. Better results are obtained from the use of saline mineral waters. The daily administration of a small amount of alkalis favors the deposition of uric acid in the tissues, although such treatment does tend to prevent the deposition of the uric acid of the urine.

There is evidence to show that uric acid is not affected by the salt of lithium. The last table shows that atophan, salicylates, and saloxyl deplete the blood of uric acid, and that radium, colchicum, diuretin, and quinine have no effect. It has been shown that the lowest level of uric acid in the blood is obtained after three days' administration of atophan. Atophan is best given in half-gramme doses with water and sodium bicarbonate four times a day. Although there is a return of uric acid in the blood to its former level a few days after the discontinuance of atophan, it is beneficial to produce periodic reductions. Many patients are kept well by taking atophan during the first four days of each month. The salicylates produce just as great reduction in the uric acid of the blood, but owing to their irritating effect on the kidney should be given guardedly in renal conditions.

For the acute attack of gout colchicum is the sovereign remedy. Thirty minims of

the tincture of colchicum should be given with fifteen grains of citrate of potash every four hours until the distressing symptoms are relieved. It should then be discontinued at once, because of its depressing effect. The use of colchicum should be limited to the attack, as it has no effect on the purin metabolism at any other time and is of no value in preventing uric-acid accumulations in the body. The bowels should be kept well open and large amounts of water ingested. Local applications of oil of wintergreen or menthol give great relief.

There are many preparations, of which piperazine is a fair sample, which dissolve uric acid in a test tube, but, unfortunately, have no effect in eliminating uric acid in the body.

TRICHLOR-TERTIARY-BUTYL ALCOHOL OR CHLORETONE ANESTHESIA.

In the *Journal of Pharmacology and Experimental Therapeutics* for November, 1916, ROWE states that the following procedure has been found very satisfactory for anesthetizing experimental animals, particularly dogs, which are to be used for blood-pressure experiments. The dog is weighed and the dose, 0.4 gramme per kilogramme body weight (or about 3 grains per pound), is quickly measured and administered. The use of a 40-per-cent solution of the drug is well suited to the purpose since 1 mil (1 Cc.) contains 0.4 gramme and should, therefore, anesthetize 1 kilo weight of the dog. The 40-per-cent solution is best prepared by dissolving the weighed amount of the trichlor-tertiary-butyl alcohol in as small an amount of alcohol as possible and afterwards bringing the solution up to the required volume by adding water and just enough alcohol to keep the drug in solution. The finished solution will usually contain 40 to 45 per cent of alcohol by volume. Where much animal experimentation is done, it is best to prepare 100 to 200 mils of this 40-per-cent solution, since it is very stable.

A smaller dose of 0.3 gramme per kilo

will often suffice to produce the necessary anesthesia, but where rapid and complete action is desired and where the recovery of the animal after twelve to twenty-four hours is not essential to the experiment, Rowe has found that the best results are obtained when the larger dose of 0.4 gramme per kilo is given.

The administration of the dose is accomplished by chaining the dog to some stationary object and drawing the animal back by one hind leg, after which the injection of the drug into the peritoneal cavity can be quickly made without danger of being bitten if the dog is so inclined. Considerable delay and difficulty is encountered if the solution is injected into the bladder by mistake, but if the site of injection is well forward toward the diaphragm, the solution will never enter the bladder. The injection occasionally is followed by some evidence of the irritating action of the alcohol, but this is quickly overcome by the local anesthetic action of the drug. Within five minutes after the injection the first results are noticed in a restlessness of the animal and some muscular incoördination. Very soon thereafter the animal is completely prostrated without a struggle, except in very rare instances, and about twenty minutes after the injection complete anesthesia is obtained, with the disappearance of the last reflex. Such a condition makes unnecessary the paralyzing of the vagi and the use of artificial respiration, except, of course, in experiments involving the opening of the thorax.

The large dose of trichlor-tertiary-butyl alcohol (0.4 gramme per kilo) acts quickly at first, and unless it greatly exceeds the minimum lethal dose, death will not result for from one to three days. In animals of abnormally low resistance, which condition can usually be recognized by an emaciated appearance, it is best to give a considerably smaller dose and follow it one-half hour later with more of the anesthetic if necessary. Small dogs weighing less than 10 kilos require only about three-fourths as much of the drug as the healthy average sized specimen. Animals that are pregnant,

and in some instances those that have been pregnant, require a much larger dose to bring about the required anesthesia, and are usually more or less unsatisfactory as experimental animals.

Trichlor-tertiary-butyl alcohol can be used in experiments where the recovery of the animal is desired, if a preliminary narcosis is produced by a hypodermic injection of morphine and followed with an intraperitoneal injection of 0.2 gramme trichlor-tertiary-butyl alcohol per kilo. This anesthesia will last four or five hours and recovery will be gradual but sure. Under these conditions more time is required to bring about the anesthesia, and the nausea produced by the morphine is a disagreeable feature. However, there is the marked advantage that the operator can work without the aid of an anesthetist and that there is a steady plane of anesthesia for the work.

In summarizing the advantages of trichlor-tertiary-butyl alcohol as an anesthetic in animal experimentation, it can be briefly said that a dose of 0.4 gramme per kilogramme body weight injected intraperitoneally produces rapid and complete anesthesia lasting from twelve to forty-eight hours with the one injection. It is easily administered, requires no attention after the first dose, and gives a very steady plane of anesthesia which is well suited to blood-pressure investigations or experimental surgery of all kinds. If the recovery of the animal is desired, morphine narcosis should be first produced and followed with one-half the above mentioned standard dose of the drug.

THE CONTROL OF CEREBROSPINAL FEVER.

The *Lancet* of February 10, 1917, emphasizes the fact that the spread of cerebrospinal fever is by healthy persons who carry the meningococcus in the nasopharynx, themselves escaping the disease, and it is estimated that some 2 per cent of the population may be carriers under ordinary circumstances, while at certain times and in certain districts the percentage may be

much higher. The proportion of carriers who develop the disease is an extremely small one. Captain Sheffield Neave, who writes in the *Lancet* of February 10 of an epidemic in East Suffolk numbering 73 cases, says: "No contacts were known to catch the disease. The insidious mode of spread accounts for the discontinuity usually observed in cases of cerebrospinal fever, and renders the disease exceedingly difficult to control. More than one type of meningococcus may be concerned in producing the disease, and the term parameningococcus has been introduced for that type which showed serological non-conformity with the classical organism. The first important research undertaken by Lieutenant-Colonel Gordon, after surmounting initial difficulties, was a serological investigation into the strains of meningococcus concerned in the existing epidemic. Taking as his criteria the phenomena of agglutination with specially prepared univalent serum, and in particular the power of absorbing specific agglutinins, he found that the races of the microbe identified in the cerebrospinal fluid in the epidemic of 1915 fell into four groups, which were similarly encountered in last year's epidemic. He termed them Types I, II, III, and IV, and proved them to breed true and to remain unaltered in their serological characters after a year's culture. In any given case only one type has been detected, and always a single type, in both nasopharynx and cerebrospinal fluid of a particular patient. The close contacts of a case have also usually harbored the same type as the affected individual. The term "epidemic type" suggested by Lieutenant-Colonel Gordon seems a justifiable one.

The practical difficulty confronting those who were endeavoring to control the spread of the disease amongst the military forces was that the isolation of the numerous positive contacts involved serious interference with the necessary training of healthy men. Now in investigating nasopharyngeal strains of the meningococcus, both in contacts and non-contacts, it had been seen

that quite a considerable proportion of them did not correspond serologically with the epidemic types. It was therefore determined to segregate only those positive contacts who were ascertained to be carrying meningococci of the epidemic types. The reduction in numbers thus affected had the immediate result of rendering practicable the policy of temporary isolation. It may be admitted that this procedure is not perfect, but from the examples given in Lieutenant-Colonel Gordon's report it appears to have met with considerable success. Thus, to quote a single example, Captain R. R. Armstrong swabbed no less than 10,000 men and provisionally isolated 410 as carriers of an organism resembling the meningococcus. Lieutenant W. J. Tulloch subsequently examined 324 serologically (the remainder having meanwhile become free of the coccus) and was able to release 103 of them on the agglutination results. No evidence came to hand that any single man of this infected garrison passed as negative by Captain Armstrong either developed the disease or passed it along to another. Whilst attended with such success in military practice it is nevertheless obvious that this mode of controlling cerebrospinal fever is not readily applicable to civil practice.

Having weeded out the probably important carriers, Lieutenant-Colonel Gordon went on to perfect a new method of curing them. While the majority of carriers rid themselves of their meningococci in a week or two, a certain number retain them for weeks or months, and no method of cure has hitherto met with much success. Trials were made by saturating the air of a small room with extremely fine droplets of a disinfectant, as had previously been done by Küster. A Lingner spray was first used, but was later replaced by an apparatus designed by Second Lieutenant E. Gordon, R. E., which proved more efficient, and is fully described and figured in the report. The first disinfectant chosen for trial proved the best. It was toluene-sodium-sulphochloramide, briefly known as chloramine-T, a substance prepared by Dr. Dakin

and Professor Cohen in the course of researches upon the mode of action of the hypochlorites. It is non-toxic and does not coagulate albumin. The air so saturated was found to sterilize plate cultures of staphylococci and yet to be tolerated by human beings for fifteen or twenty minutes. A group of 14 chronic carriers received the treatment daily, and all but three were cured after at most 13 daily inhalations, though some had been carriers for 10, 12, and even 17 weeks. Later trials were made with zinc sulphate in place of chloramine, but the results were much less satisfactory. Chloramine treatment appears to offer a better prospect of quickly curing the carrier condition than any which has yet been tried. Besides these two important investigations the report contains a large amount of valuable detail, notably in Captain M. Flack's report on his work in the London district during 1916. As a whole, it deserves careful study and is encouraging as an earnest of further progress.

THE AFTER-CARE OF INFANTILE PARALYSIS FROM THE POINT OF VIEW OF THE MEDICAL PRACTITIONER.

In the *Long Island Medical Journal* for November, 1916, AGER says that by after-care is meant the treatment of those children who have acquired a greater or less degree of paralysis and possibly deformity as a result of this infection. According to the orthopedic surgeons the after-care is that which is employed when the acute stage is past; and the acute stage is defined as the period during which pain and tenderness exist. It is generally conceded that any form of active treatment is dangerous and probably harmful so long as any tenderness is present. This acute period is exceedingly variable, but in a large majority of cases it does not last more than four weeks and in a considerable percentage but two weeks.

Even during the acute stage something may be done to prevent deformities by keeping the limbs and back in a fairly normal position by support, and by counteract-

ing the effect of gravity and the weight of clothing. Nevertheless, at this stage damage may be done by forcible or painful retention of the body in uncomfortable attitudes. Careful observation has convinced Ager that better end results are obtained by permitting considerable flexion of the knees, thighs, and back in cases in which marked tenderness is present, than by retaining the body in an uncomfortable attitude. In other words, the greatest amount of rest is secured to the inflamed areas by maintaining every muscle in as comfortable a position as possible by the support of pillows, cushions, and pads, regardless of the attitude that may be assumed.

If a careful study is made of the teachings of the different orthopedic schools it will be found that there is considerable difference of opinion as to the relative value of massage, electricity, plaster, and braces. The tendency at present appears to be to employ massage and electricity to a much greater degree than ever before. This is due to the popularity of Dr. Lovett and his followers, and as Ager is not skilled in orthopedic work he will not venture to express an opinion as to the relative value of different lines of treatment. Nevertheless he is under the impression that the orthopedic work done in New York has given as good results as that done elsewhere. However, we all know what the after-treatment is intended to accomplish, and we must think for ourselves in drawing conclusions as to the best methods to secure the desired results.

At the end of the acute stage we are confronted with a certain amount of destruction, by hemorrhage and inflammatory action, of central nervous areas, most of them located in the motor portion of the spinal cord. Surrounding these areas in which actual destruction has taken place there are large areas in which temporary injury has been inflicted by edema and pressure. The areas which have been only slightly damaged return rapidly to a normal state if not interfered with. So long as nutrition is maintained by proper food, sun-

light, and elimination, the improvement will be marked unless injurious treatment is given, as is undoubtedly the case in many instances.

As a result of the actual destruction of nerve centers the so-called residual paralysis occurs with the marked wasting and deformities which used to be considered inevitable. Thanks to the orthopedic surgeons these effects of the disease are also being prevented or corrected to a greater degree every year; but this work requires the most skilful training and the long-continued coöperation of parents and family physicians. Briefly we aim by intelligent treatment to assist the body in every way possible in its wonderful powers of regeneration, and at the same time to prevent the harmful results of the damage that has been done.

EXOPHTHALMIC GOITRE.

In the *Lancet* of November 11, 1916, MACKENZIE states that his present views on *x-ray* treatment are: It may prove to be far the best means of treatment at our command. It must be applied in no half-hearted way. It must be persevered with and in many cases continued for a long period of time. It is most likely to prove beneficial in cases in which the thyroid enlargement is moderate and the patient is not so seriously ill as to necessitate confinement to bed. He thinks it may prove valuable in bringing about a retrogression of the remaining thyroid after a hemithyroidectomy. He has not at present sufficient evidence to speak of its usefulness where the goitre is a very large one. It has seemed to fail, as other remedies do, in cases of a severe type and rapid course. The trend of present experience in respect of *x-ray* treatment is decidedly in favor of its further trial, and he would draw attention to a few recent important references to its effects.

Halsted has recently been making trial of *x-ray* treatment of the thymus which Mackenzie has mentioned he employed seven years ago without any very striking

results. But Halsted has used it in cases in which he had previously removed most of the thyroid, and the resulting improvement was not satisfactory. In these cases he thinks the *x-ray* treatment has been very satisfactory.

Murray has stated that treatment with *x-rays* has in some of his cases proved to be of great value. The gland gradually diminishes in size and the symptoms subside. These changes are, however, slow in development, so that the full effect of the treatment is not obtained until some months have elapsed. Fifteen to twenty weekly treatments have brought about great improvement or practical recovery in some cases. In others only slight improvement has followed similar treatment. Mackenzie thinks it is worth while to persevere with *x-ray* treatment for as long as twelve months if satisfactory progress is made.

Stoney has written enthusiastically of the effects of *x-ray* treatment. Of 48 cases treated (of which 22 had no exophthalmos) 14 (of which 5 had no exophthalmos) were cured. The average number of treatments of the cases cured was 31, the smallest number was 10, and the largest 50. She gives a small dose each time for about seven to ten minutes. In acute cases she gives it twice a week for a month, then stops it for a fortnight. In chronic cases one treatment weekly suffices, but it must be continued in severe cases for six to eight months. Early cases are cured with a few treatments. Long treatment is only required where the case is very acute, where rest is unattainable; or where the case is of old standing.

Of the effects of radium treatment Mackenzie has no personal experience to relate. Reports which have been published by Turner and others seem to show that they are very similar to those of *x-rays*, and if this is confirmed radium treatment would be a valuable addition to our armamentarium. It is obvious that radium treatment might be employed in cases in which *x-ray* treatment was unobtainable.

Surgical methods of treatment of exophthalmic goitre have long been advocated

and employed with the object of bringing about a more certain, a more lasting, and a speedier cure than can be obtained by other means. In the first cases in which partial thyroidectomy was performed the operation was done to relieve dyspnea, as in a case operated on by Lord Lister in 1877. It was found that not only was the dyspnea relieved but all the symptoms were alleviated.

If the controlling and fundamental agent in keeping up the symptoms of the disease was the hyperplasia and overactivity of the thyroid gland, it seemed the most hopeful and rational means of treatment was to attempt to control that, and to the surgeon the use of the knife seemed the most natural method of dealing with it. He could cut away as much of the gland as was superfluous and leave the patient with just as much thyroid gland as was necessary for health. The theory seemed attractive; how did it work out in practice? Unfortunately, it was found that the operation had special dangers of its own, and while partial thyroidectomy in ordinary goitres was a comparatively safe operation, in exophthalmic cases it not infrequently proved fatal. The earlier statistics showed a death-rate of over 12 per cent for the whole number, and among the severe cases it was as high as 22 per cent. Later statistics show better results, however.

Mackenzie's own experience of operation in cases of exophthalmic goitres has, on the whole, been very unfavorable. In several chronic cases in which the tumor was large partial thyroidectomy has been successfully carried out with relief to the patient, but although he has seen patients who have been benefited he has not seen any case that he could say was actually cured.

The risks attending thyroidectomy being considerable, surgeons have introduced modifications of the operation to diminish the danger. Ligature of the thyroid arteries was done as a preliminary in many cases, and according to Kocher it was found that ligature of one superior thyroid artery brought about a slight amelioration, which was increased by ligaturing both, and still

more by ligaturing the inferior thyroid on one side in addition. So it came about that ligature of the arteries was frequently done as a preliminary to hemithyroidectomy and sometimes as a curative method in itself.

Mackenzie's views of operative treatment are:

1. If done at all operations should be performed under local anesthesia. Local anesthesia is specially indicated in younger subjects.
2. Ligature of the thyroid arteries does not appear to have any appreciable effect on the disease, and therefore, if done at all, it should only be as a forerunner of thyroidectomy.
3. Thyroidectomy does not cure unless a sufficient amount of gland is removed.
4. If possible, it is better to remove more than an entire lobe at one operation. He does not think the risk will be appreciably increased if this is done.
5. If a whole lobe is left behind it is probable that another operation will be necessary at a later time, unless by means of other treatment a sufficient reduction of the remaining lobe can be brought about.

ACUTE PURULENT INFECTIONS OF THE NOSE, THROAT, AND EAR.

HASTINGS in the *Journal of the American Medical Association* of December 2, 1916, in writing on this topic asserts that the public is not sufficiently aware of certain preventive measures, which may be briefly summarized as follows:

1. A daily cold bath. If the cold tub bath produces too much shock, a cold sponge bath about the face, neck, chest, and shoulders may be substituted.
2. Fresh, circulating air in the bed-chamber. The sleeping porch accomplishes this result. The fad for outdoor sleeping, while in the main good, can be abused, for it is his experience that some people, particularly some children, are better off indoors, especially in cold, damp weather. The attempt to "harden" children who are susceptible to bronchitis and laryngitis, by forcing them to sleep outdoors in bad

weather, is especially to be condemned. Morse, in an instructive paper on the cold-air treatment in pneumonia cases, remarks that he has seen no ill effects from cold fresh-air treatment of patients with lobar pneumonia, but believes harm is done in pneumonia cases complicated by bronchitis. This has been the experience of laryngologists for a long time in regard to acute inflammations of the upper air tract.

3. Another preventive measure against "colds" is the avoidance of plunges, especially during epidemics of "colds." Plunges are contaminated at such times by the nasal secretion of those affected. The sanitary control of our college gymnasium and Y. M. C. A. plunges, various baths and athletic club plunges is a problem that is only of late being recognized. There is a wide-spread ignorance and complete indifference on the part of those in charge of them. A recent paper by Levine gives some facts on this subject, based on the examination of the swimming pool of the Iowa State College. Frequent changes of the water of a swimming pool, at least once a week, with periodic cleansing of the bottom and sides of the empty pool with ordinary lime bleach (calcium hypochlorite), is a safe measure. Where the cost of water is such that the water must be used again, Levine recommends that the water be pumped into a filtration plant, the empty tank cleansed, and the water be pumped back again, and disinfected in the tank by the use of copper sulphate, one part to a million. A bag containing the copper sulphate is drawn along the surface of the water until it is dissolved, a procedure that takes about fifteen minutes.

4. Another preventive measure against "colds" is the care in handling the nasal secretion of an infected member of the household. Handkerchiefs of cheese-cloth should be used as much as possible and burnt. In the early stage of a "cold" sneezing is not a harmless pleasure.

5. The use of vaccines, much lauded in various quarters to prevent "colds," has not proved of value in the experience of those qualified to pass judgment on this point.

WHAT TO DO WHEN THERE IS DISEASE OF THE LUNGS IN PREGNANCY.

In the *Long Island Medical Journal* for February, 1917, McGOLDRICK states that to arrive at the safest and best conclusion in any one case there is required the combined judgment of the clinician and skilled obstetrician, arrived at, not from a single examination and consultation, but after careful observation of the course of the disease in that individual. Urgent symptoms, such as persistent hemorrhage, cardiac embarrassment, and increasing dyspnea, may have an opinion-deciding influence of their own. Arbitrary rules of treatment are useless.

It must not be forgotten that many, many patients with active, though slight, lesions have successfully and repeatedly, as De Lee puts it, gone through their pregnancies and borne living children; that patients with quiescent lesions, aggravated by parturition, have later regained their former health; that some patients with far-advanced lung disease and suffering from mixed infection have gone to term and been restored to fairly good health; and that many more will be saved in proportion to the early recognition of the disease and the utilization of all the means to arrest it.

In this paper, necessarily condensed at the expense of many phases of this subject, McGoldrick emphasizes:

1. That tuberculosis associated with pregnancy, and because of that association, is often overlooked until it has passed the stage when most relief can be given.

2. That tuberculosis may have its inception (as usually called) or that an existing case may become aggravated during gestation, parturition, or puerperium, and that the period in which this occurs most frequently is the puerperium.

3. That the child born of a woman with advanced tuberculosis at the time of birth is not necessarily doomed to a short existence.

4. That of surgical measures, abortion (*i.e.*, in the first three months) has no indication as a remedial agent, and as a pro-

phylactic for further pulmonary disease is of great danger and little value; that the same ruling applies to miscarriage (*i.e.*, in the second three months); that, theoretically, in the last three months indications may exist for the induction of labor and rapid delivery with good results, but that practically these indications are rarely met—with the great exception that for the purpose of making labor easier the suggestion of Edgar that it be induced two weeks before the expected date should prove of much service; and, finally,

5. That continued care of the mother—following early diagnosis, under the best environment and possible circumstances, with the rapid cure of all the pregnancy toxemias, the shortened second stage of labor and the prevention of lactation—care continued postnatal, as well as prenatal—affords us the greatest hope at the present time.

THE TRANSFUSION OF BLOOD IN THE TREATMENT OF PERNICIOUS ANEMIA.

In the *St. Paul Medical Journal* for February, 1917, ARCHIBALD reaches these conclusions:

1. Sixty-nine per cent of the entire series of patients received marked immediate benefit from transfusion. In 50 per cent of the fourteen unfavorable cases the patients showed similar improvement. All except three were given the transfusions during the crisis, so that undoubtedly transfusion was the cause of the remissions.

2. In fifteen of the twenty-six cases, two or more transfusions were necessary. When no benefit is derived from one transfusion, a different donor should be tried.

3. Chronic cases with a history of remissions are the most likely to respond to transfusion. Other types of pernicious anemia may also respond. It is impossible to foretell the results of transfusion in any individual case.

4. The age of the patient up to the sixth decade has no effect on the results of transfusion.

5. When the blood is properly tested

transfusion is practically free from danger. A slight reaction following transfusion is not necessarily indicative of improvement.

In discussing this paper Nadeau said Dr. Archibald has given an excellent report of the indications and results of blood transfusion in pernicious anemia. We will be interested in the technique of an indirect method of whole blood transfusion which has been used in some of the cases in the Mayo clinic. This method has been used by Dr. Percy at Augustana Hospital, Chicago, Ill., with uniformly excellent results since 1912.

A suitable donor is first tested by the Moss method of classification. It is sometimes difficult to find suitable donors, but they can usually be found among the patient's friends, professional donors being but rarely required.

Both donor and recipient are placed side by side in the operating-room and, under novocaine anesthesia, a small incision made over the median basilic or cephalic vein just above the elbow of each. The vein is dissected free and a fine catgut ligature is placed about one end, proximally in the donor and distally in the recipient. Temporary clamps are placed at the other end of the dissected vein and a small incision made between clamp and ligature, and the edges held open by means of small mosquito clamps.

A tube is used to carry the blood from donor to recipient. It is made of glass, is graduated, and has a total capacity of about 900 Cc. One end is drawn out into a cannula and the other end into a spout. The tube is sterilized and the entire inner surface covered with a thin layer of solid paraffin. A rubber tube is attached to the end opposite the cannula, to which are connected arrangements for suction and pressure of air within the glass tube. About 30 Cc. of sterile liquid paraffin is then drawn into the container. The cannula is inserted into the donor's vein and the required amount, usually 500 to 800 Cc. of blood, is withdrawn into the container, which is immediately transferred to the vein of the recipient and the contained

blood expressed into the recipient's circulation. It is a good rule to allow the first 50 Cc. to flow slowly and to watch the condition of the patient. Evidence of hemolysis is as evident after the mixing of small quantities as of large quantities of blood. If no untoward effects are perceivable, the remaining amount may be given in the space of from one to two minutes.

This apparatus is a modification of the Kimpton-Brown tube. The method has the advantage that whole blood touches nothing but paraffin, not even air, from the time it leaves the vein of the donor until it is injected into the recipient.

Whole blood transfusions are given in cases of secondary or pernicious anemia. In pernicious anemia, from one to five transfusions of 500 to 800 Cc. are given at periods varying from seven to ten days apart. When the patient's condition has improved to such an extent that an operation is safe, a splenectomy is done and is immediately followed by a blood transfusion. By this method many cases of pernicious anemia have been free of all remissions for as long a time as three years.

The first requisite is a thoroughly clean tube. It is washed well with hot water, followed by several changes of alcohol, several changes of ether, and, finally, air is blown through in order to remove the ether. This process leaves the tube clean and dry. One ounce of ordinary grocers' paraffin is next melted and drawn into the tube and allowed to harden. An assistant wearing sterile rubber gloves then heats the entire tube over a gas flame until the melted paraffin begins to smoke. This process both melts the paraffin and sterilizes the tube. It is then taken from the flame and rolled until cool, when a thin coat of paraffin will be left clinging to the entire inside of the tube. Care must be used not to clog the cannula with paraffin. Two ounces of ordinary sterile medicinal liquid paraffin is then drawn into the tube, which is now ready to use. The rubber tube connections are boiled fifteen minutes in order to sterilize them.

Dr. Archibald in closing said there is no

permanent cure for pernicious anemia, and it is difficult to decide whether transfusion or splenectomy gives the more satisfactory temporary results. At the Mayo Clinic the results of splenectomy are the more prolonged in properly chosen cases; that is, there are more prolonged remissions in the greater percentage of cases. After transfusion there is no change in the amount of the destruction of the blood, whereas in splenectomy destruction decreases and the bone-marrow seems to be stimulated. This can be decided from Schneider's method of examining the duodenal contents. In the severe cases of pernicious anemia we find a great amount of urobilin and urobilinogen in the duodenal contents. After splenectomy these pigments are markedly decreased in amount and in many cases entirely disappear. They have determined the duodenal contents in a few cases after transfusion and have found no change. This has been the experience of others. In the transfusions done at the Mayo Clinic the sodium citrate method is employed. Into 50 Cc. of sodium citrate in a syringe 500 Cc. of blood is allowed to flow, making a mixture of 2-per-cent sodium citrate. It is very important that the percentage should not be below 2 per cent, for it has been found that severe reactions will occur.

DIGITALIS AND PNEUMONIA.

In the *Journal of Experimental Medicine* for January, 1917, COHN and JAMIESON make a report upon their employment of digitalis in the form of digipuratum in forty-nine cases of pneumonia, using fifty-six other cases, which received no digitalis, as controls. The drug was given by the mouth in the form of tablets, the dose usually being one and a half grains four times a day. The action of the drug was studied by the electrocardiograph. Cohn and Jamieson believe that the fever present in pneumonia does not interfere with the action of the drug, and that the intoxication due to the disease also does not interfere with its effects. They think it particularly useful where there is auricular irregularity.

[These conclusions are not in entire accord with the observations of many other clinicians as to effects of digitalis in fever and in infections.—Ed.]

THE RELATION OF SO-CALLED ETHER PNEUMONIA TO PELVIC AND ABDOMINAL SURGERY.

In the *Medical Record* of November 11, 1916, DARNELL states that for many years it was commonly taught that ether irritated the bronchi and was largely the cause of what was known as postoperative pneumonia. Such pneumonia was spoken of, and still is in most hospitals, as "ether pneumonia." Yet any surgeon in reviewing his experience might find many facts to disprove, and few or no reasons to prove, that ether is the cause of pneumonia after an operation. Ether is administered in most hospitals many times every day, yet the condition known as ether pneumonia is a rare occurrence compared with the number of ether administrations given. If the pneumonia were the result of the ether, we ought to expect to have many cases every week. Again, if ether produced all the havoc it has been credited with, the administration of it by the intratracheal method might almost come under the classification of criminal malpractice. Yet we know that this is done safely every day. Rovsing had proved experimentally that although ether does occasion increased secretion of the salivary glands of the mouth, the larynx and trachea and the bronchi are not irritated at all, even when animals are killed by administering ether through a tracheotomy tube. The only way, therefore, that ether can produce pneumonia is by the aspiration of the accumulated saliva in the throat, usually the result of technical error on the part of the anesthetist, who should not allow the secretion to accumulate in the mouth. Such secretions may, of course, be easily infected from the buccal cavity. It was quite possible under such circumstances that tonsillar infections, involvement of the nasal accessory sinuses, or the teeth, might be one of the causes of

postoperative pneumonia which has been attributed to ether.

Attention has frequently been called to the importance of the sanitation of the nose, throat, and mouth before all operations. If we looked on pneumonia after an abdominal operation in the same light as we do the development of a subphrenic abscess after an appendectomy, it will bear the same analogy as to the point of original infection. The only difference is that in the one case the new focus of infection landed above the diaphragm, and in the other beneath it, but both are brought about by the carrying of infection from the original source in the abdomen up through the lymphatics and veins by the retroperitoneal route. The idea was further strengthened by the fact that most postoperative pneumonias show a mixed infection containing streptococci, colon bacilli, or other organisms in addition to pneumococci. On the other hand, it is often true that the appendix, the gall-bladder, the Fallopian tubes, and the ovaries are the seat of a pneumococcus infection.

It would seem proper to conclude, therefore, that cases of pneumonia following operations were not due to the ether. The term "ether pneumonia" should be discarded and forgotten. Postoperative pneumonia occurs with great rarity except after abdominal operations, and is then probably due to an infection already existing in the bronchi or lungs at the time of operation, or to imperfect aeration and ventilation of the lungs, but most often such pneumonia is a secondary infection of the lung following a septic abdominal condition.

SCARLET FEVER.

In the *Boston Medical and Surgical Journal* of November 16, 1916, CHAPIN, who is Health Officer in Providence, R. I., states that scarlet fever is certainly infectious as soon as the first throat symptoms appear. The infectivity is at its height during the first days of the disease. In uncomplicated mild cases it soon begins to diminish. Many think that a large proportion of mild cases of scarlet fever are free from infection by

the end of the third week; doubtless, at times, even earlier. Unfortunately in many cases the infectivity is greatly prolonged. The experience of the London hospitals shows that five, or six, per cent of the cases are infectious for over six weeks. A few cases remain infectious for months. There seems to be a correlation between the complications and the duration of infectivity.

The infective material is certainly found in the throat secretions. The pathological condition also extends to the nose, as in diphtheria, giving rise to a nasal discharge, which is also infectious, as in the latter disease. So also is the aural discharge, but this is not so important. Nothing is known about the infectivity of the urine. There is a large amount of evidence that the exfoliated epidermis is not infectious. This can safely be disregarded in the release of patients. Patients should be isolated as long as there is any inflammation of the throat, any nasal or aural discharge. The latter may, however, at times be disregarded, especially if the ear is to receive proper treatment. The removal of tonsils and adenoids, if the operation is indicated, is believed by many to shorten the period of infectivity. After every precaution is taken, it will be found that a certain number of cases, apparently entirely normal, are yet infectious—that is, they are true convalescent carriers. For a mild, uncomplicated type of the disease, probably four weeks is a reasonable period of isolation. When the disease is more virulent, and there are many cases with complications, it is doubtless safer to prolong it a week or two.

The disease frequently presents a very mild type. There are numerous cases with a slight sore throat, a very fleeting eruption, and scarcely any fever. Sometimes there is no eruption. They are doubtless true carriers—that is, persons infected but presenting no symptoms whatever; but our knowledge of these is limited. There is evidence that the number of mild, unrecognized cases is large, perhaps equal in number to the reported cases.

Scarlet fever is not especially contagious. It is less so than measles, whooping-cough,

chicken-pox, or smallpox. It is spread almost exclusively by contact with the fresh secretions of the throat and nose. It is rarely, if ever, air-borne. Infection by fomites, as the term is ordinarily understood, is negligible. Infection almost never passes from one family to another in the same dwelling unless the families mingle.

Isolation of the case in the family is not very difficult. Too much should not be attempted. The most important matters only should be insisted on, otherwise complexity of detail will result in neglect. The patient, of course, must be kept in one room. One person only should act as a nurse. A wrapper, which is kept in the room, is to be worn if much is to be done about the patient. On leaving the patient, the hands must always be washed in hot soap and water and well rinsed, preferably in running water. As few dishes as possible should be used, and these should be scalded and washed by themselves. Soiled linen should be placed in a wash-boiler or dishpan kept in the room, and should afterward be boiled. It is preferable to have these procedures demonstrated by a nurse. It seems likely that frequent visits by a nurse during the course of the disease is the most effective means of securing proper care of the case and enforcement of rules. It is better than visits by doctors, or policemen, though the latter are sometimes needed.

Children in the family should not go to school. Those who are susceptible should be well isolated for a week. Later they may be allowed more freedom. Adults should not be seriously restricted. Milkmen and other food handlers should move away, also those who come in contact with children. Laborers, mechanics, clerks, and indeed most wage-earners, need not be kept from their occupation.

The most expensive means of isolation is the hospital, yet it is a necessity. There are a considerable number of persons who are so ignorant or careless, or who live under such bad conditions, that reasonable isolation at home cannot be secured. While

the proportion of wage-earners who should be kept from work is not large, keepers of small stores connected with the house, peddlers of fruit, candy, and ice cream, messengers and others, are apt to live so that home isolation is not practicable, but their loss of occupation would be a serious economic disaster. It is by no means necessary to attempt to provide hospital accommodations for from 90 to 95 per cent of the cases, as is done in England. Probably if 40 or 50 per cent of the cases most needing it could be removed to a hospital, the full value of the latter would be secured.

THE TREATMENT OF MERCURIAL STOMATITIS.

MONTGOMERY in the *Medical Record* of November 18, 1916, says that peroxide of hydrogen is now regarded as almost a specific in mercurial stomatitis. Nicholas mentions that it will often prevent its development, and frequently will cure one already under way. Scholtz says that as soon as the gums begin to swell and a purulent film appears, a very dilute perhydrol solution (1:500 or even 1:1000) constitutes the best mouth-wash. The question as between peroxide of hydrogen and perhydrol is an interesting one. Perhydrol is a 30-per-cent solution of peroxide of hydrogen, H_2O_2 , and is free of acid. It therefore differs from the peroxide of hydrogen solution of the Pharmacopœia in being acid-free, and in being ten times stronger. The addition, however, of a very small quantity of acetanilide stabilizes the H_2O_2 and enables it to be made so slightly acid as not to be hurtful, so that the difference between the two preparations, when carefully made, is reduced to a matter of strength, and as they are almost always employed highly diluted in stomatitis mercurialis this difference may also be equalized. Perhydrol has the disadvantages of being expensive and being liable to explode. Expense under the circumstances is a matter of importance, as the free use of the mouth-wash is essential.

Scholtz employs the following prescription:

R Sol. perhydrol, 5.00;
Aq. ad, 200.00.

M. Sig.: A teaspoonful in a half or a full glass of water as a mouth-wash several times a day.

As peroxide of hydrogen is one-tenth the strength of perhydrol an equivalent prescription would be:

Peroxide of hydrogen, 50.00:
Aq. ad, 200.00.

Sig.: A teaspoonful in a half or a full glass of water.

This is slightly astringent and antiseptic, it cleans the mouth and gums, and dissolves and scatters the mucopurulent coating, and therefore deprives the anaerobic bacteria of their food. As occasion requires, this solution may be employed stronger.

In cases in which the margin of the gums is still more strongly affected, as in pyorrhea alveolaris, undiluted peroxide of hydrogen may be directly applied, or a mixture of equal parts of peroxide and a 20-per-cent solution of nitrate of silver:

R Peroxide of hydrogen,
Argent. nitric. (20-per-cent sol.), aa 10.00.

M. Sig.: Apply with a cotton swab.

Both chlorate of potassium and peroxide of hydrogen, the two remedies found so excellent in mercurial stomatitis, give off their oxygen very readily, and it may be presumed that it is to this circumstance that they, in a great measure, owe their effect in interfering with the activity of the anaerobic bacteria. [Do not mix chlorate of potassium and peroxide.—ED.]

Liquid alumini acetatis, a teaspoonful or less in a glass of water, makes an excellent mouth-wash and gargle.

There are several good mouth-washes on the market of the same general formula as the liquor alkalinis antisepticus. A principal ingredient of these is borax, a mild antiseptic of an unctuous, soothing nature. Boric acid may be used advantageously, dissolved in water, a heaping teaspoonful in a glass. Years ago Montgomery ran across a recommendation by Louis Brocq of adding boric acid powder to slippery-elm bark tea, which makes a particularly smooth, simple, mildly antiseptic preparation in irritative lesions of the mouth. First

the infusion is made by putting a handful of the bark in a moderate sized pitcher and adding hot water. After standing for some time the tea may be poured out through gauze. A heaping tablespoonful of boric acid powder may be added to a quart bottle of this infusion. If this is more than sufficient to dissolve, the residuum sinks to the bottom of the bottle, and in any case can do no harm. The patient may carry a quantity of this in a flat bottle in his hip pocket for frequent use. Every author insists on the frequent employment of these mouth-washes as being of the utmost comfort to the patient, and it is one of the chief advantages of the acetate of aluminum, boric acid, and very dilute peroxide of hydrogen mouth-washes that they can be so employed, without either inconvenience or financial embarrassment.

Chromic acid, in 10-per-cent solution, is the best application for erosions. It must, however, not be used too frequently, as in that case it will irritate an already irritable condition. A swabbing every two or three days is usually much better than a daily application. Nitrate of silver in 10-per-cent solution, or as the stick, may also be used in the same way, but usually does not act so kindly. When the gums are very soft and swollen, it is best to brush them with a 10- or 20-per-cent solution of nitrate of silver followed immediately by a 10-per-cent solution of chromic acid (Scholtz).

Chromic acid may be used in yet another way when ulceration occurs. A 25-per-cent solution is brushed over the surface, followed by the application of nitrate of silver stick (Boeck). A combination of red chrome silver is formed as a crust, under which healing takes place. In larger ulcerations iodoform gauze may have to be laid between the gums and the cheeks. Montgomery has never had to employ either of these expedients, but no man can say when he will have to do so, as in giving mercury hypodermically the dose is ir retrievable, and the patient may be hypersensitive to the drug. Furthermore it is well known that the most severe cases of stomatitis may occur with the inunction

treatment. The two effective ways of administering mercury, therefore, are intimately linked with a possible severe stomatitis.

Tincture of rhatania, tincture of nutgalls (gallarum), and tincture of myrrh are employed for their astringent effect. They are, however, of less value than those previously mentioned, but may be very useful when the gums are in good order.

R Tr. rhataniæ,
Tr. gallarum, aa 15.00.

M. Sig.: Fifteen to twenty drops in a half-glass of water as a mouth-wash.

The elimination of an offending substance must be fundamentally more important than the control of the symptoms it produces. This axiom holds as good for mercury, causing a severe stomatitis, as for any other foreign body. The first step to be taken, therefore, is to stop the drug, and if inunctions have been employed, to give a hot bath with plenty of soap to free the skin of the mercurial ointment. Some would add Vlemingkx's solution to this bath in order that the inert black sulphide of mercury may be formed. The essential, however, is the water, the soap, and the scrubbing to free the skin of the mercury, and so to stop absorption and inhalation.

Formerly the impure sulphuret of potassium, called "liver of sulphur," was much used for sulphur baths, but now Vlemingkx's solution is generally preferred. This solution is made by adding quicklime to sulphur and boiling it down:

R Sulphuris sublimati, 3v;
Calcis vivæ, 3xxx;
Aq., 5l.

Boil together with constant stirring until the mixture measures ounces xxx. This is sufficient for about five baths.

One hundred and fifty to two hundred grammes, or five or six ounces, are added to the bath. The two disagreeable features of this bath are its evil odor and the way it blackens a metal bath-tub. The advantage to be reaped in fixing the metal mercury as the black sulphide is very small, as all the metal attainable on the surface can be removed by a bath of soap and hot water.

The rate of the elimination of mercury varies greatly in different cases, and the reasons for the variability are usually unascertainable. There seems to be no doubt that the chief emunctory is the intestinal canal. Vogel and Lee, for instance, recently have found that, in cases of bichloride of mercury poisoning, the mercury persisted longer in the feces than in either the stomach washings or in the urine.

The next measure, therefore, after stopping the drug, is to see that the bowels are acting properly. A dose of castor oil may be given as the best cleanser of the alimentary tract, and this should be followed by a steadily acting laxative, such as senna or rhubarb, which may be advantageously combined with a diuretic:

R Pot. acetatis, drachm v;
Ext. sennæ fl., ounce ij;
Aq. gaultheriæ ad., ounce iv.

M. Sig.: A teaspoonful in a little water p. c. t. i. d.

To give a diuretic and not to give abundance of water is like putting a mill-wheel in a dry mill-race. The patient, therefore, should be advised to take warm drinks in plenty. The value of the various teas rests probably in the fact that many people cannot take plain warm water without nausea. These teas set the skin as well as the kidneys in action, and if to this ingestion of hot water there is added a hot bath with a subsequent rest in bed of two hours to encourage perspiration, much will be accomplished.

Here may be mentioned the administration of atropine as a hypocritic. A hypocritic is a drug that lowers the secretory activity of a gland, and for this purpose the use of belladonna and atropine has been advised to control the tormenting salivation. If, however, these drugs are given to lower the activity of one set of glands, they just as surely lower activity in others, and therefore interfere with the intestinal, renal, and cutaneous elimination of mercury. Furthermore, the effect of these drugs on the salivary glands is apt to be very little, whereas their general effect on the entire secretory system may be quite pronounced, and therefore more harm than good may

easily be accomplished by their employment. All the other hypocritic or inhibitory drugs are in the same category. Many men, for instance, prescribe opium with mercury as a routine practice in giving mercury by the mouth, with the double purpose of preventing a diarrhea and of allowing the mercury to accumulate in the body. It is not, however, the mercury that accumulates in the body that does the good, it is that that actively changes into a form noxious to the spirochete and then passes through, carrying with it the peccant materials. The action is, therefore, spirocheticidal and eliminatory, and any interference with elimination is detrimental both in the treatment of syphilis and in any of the accidents produced by mercury.

In reflecting on the phenomena of mercurial stomatitis one cannot fail to be struck with their intimate connection with the teeth. Sensitiveness of the teeth is one of the first symptoms; the trouble is most apt to begin in the neighborhood of the teeth; the condition of the teeth is of the first importance in the incidence of the symptoms; absence of the teeth secures a comparative immunity; and the treatment is largely directed toward the care of the teeth and gums.

TREATMENT OF CARRIERS OF AMEBIC DYSENTERY.

The *British Medical Journal* of November 4, 1916, points out that attention has frequently been drawn to the importance of the problem presented by chronic carriers of *entamoeba histolytica*, owing to the fact that this form of infection, whether following an acute attack of dysentery or discovered apart from any history of dysenteric symptoms, has, in a considerable proportion of cases, proved resistant to treatment by the hypodermic injection of emetine, which has been found so efficacious in acute dysentery by all who have used it since Sir Leonard Rogers published his first papers on the subject in the *British Medical Journal* on June 22 and August 24, 1912. The paper by Sir Clifford Dobell affords evidence of the frequency with

which contact carriers, as well as convalescent carriers, occur among those who have been exposed to infection in an endemic area, and fully confirms the fact that the ordinary treatment by the hypodermic injection of emetine often fails to free such persons from infection. Just two years ago Du Mez, of the school of pharmacy of the University of the Philippines, suggested the use of a double salt of emetine and bismuth—emetine bismuthous iodide—and gave an account of its mode of preparation and constitution.

It is a brick-red powder, insoluble in water, or water acidulated with hydrochloric acid, and stable in air. According to Du Mez's calculations it contains 58 per cent iodine and 12 per cent bismuth, with 29 per cent emetine. Insoluble salts of bismuth are converted into bismuth sulphide after passing the pylorus, and in all probability the reaction is very slow, taking place as the compound is spread out over the wall of the intestines. Three grains of the double salt, containing about 1 grain of emetine, seems to be a good average daily dose, and twelve such doses may be given in succession. In the recent trials of the drug recorded by Mr. Dobell the double salt was given in cachets containing one grain each, until 36 grains had been taken. Vomiting, if it occurred, usually did not come on until some time after the dose had been taken, indicating probably absorption from the intestine and not from the stomach. It is recommended that the dose should be given after a full meal, when the stomach contents will be certainly acid, and on the whole the drug was well tolerated. Lieutenant Matthews, who had clinical charge of the cases, stated that he has found it best to persist with it in full doses, as tolerance is usually established in a couple of days, and more quickly than if the dose is reduced on account of the vomiting.

Mr. Dobell gives an account of a systematic investigation of this double salt used in a military hospital in the hope of freeing carriers of the infection. The investigation has had the enthusiastic coöper-

ation of the hospital staff, and the laboratory work has been carried out with the thoroughness to be expected from a protozoologist of his authority. The conclusion to be drawn is that, making all allowance for uncertainties, due to the limit set to observation by practical considerations, there seems no room for doubt that an advantage is to be gained by administering emetine in the form of this double iodide in these chronic cases of amebic infection. Other reports on isolated cases and some interim accounts of further systematic trials have come to hand; and on the whole the results are similar to those recorded by Mr. Dobell. There have, indeed, been groups of cases showing less completely favorable results. Inquiry into some such cases raised a doubt as to whether the patients had really taken the drug; in others the full course had certainly not been given; but when due allowance is made for these sources of error it has to be admitted that a residuum of apparent failures remain. There is, however, no evidence from any source to weaken the conviction that the chance of curing a carrier of *entamoeba histolytica* with the double iodide is very much greater than with emetine given as any other salt or as ipecacuanha. The curative results have, indeed, been far beyond the original expectation.

On the other hand, the hope that the relative insolubility of the double iodide would prevent vomiting, which was so tiresome a complication of the old ipecacuanha treatment, has not been altogether fulfilled. The vomiting has, in not a few cases, been troublesome; and it would appear that some medical officers have been so discouraged by it as to abandon the treatment. It may be suggested that they exaggerate the importance of an admittedly unpleasant symptom; for those who have persisted in spite of it report, with remarkable unanimity, that in most cases the patient becomes tolerant after a dose or two, and that the improvement the treatment effects in the general health is as striking as, and doubtless dependent on, the disappearance of the amebic infection. Some detail of admin-

istration may, it is hoped, soon be discovered which will remove the difficulty due to nausea and vomiting. Meanwhile, it may be hinted that this effect of the double iodide, as now given, causes in some patients a natural reluctance to swallow the dose, and imposes a special duty on the medical officer, who desires to cure his cases, of seeing that it is actually taken. Cases have been reported in which keeping the men in bed during the treatment, instead of handing them the dose and allowing them to leave the hospital building, has improved the results in a significant manner. It is to be hoped that a relatively trivial drawback will not be allowed to obscure the duty of using every available means for rendering those who have had the misfortune to acquire a chronic infection with *entamoeba histolytica* free from the danger which this condition entails on themselves and on others, more especially under the conditions of hardship and improvised sanitation inseparable from a military campaign.

It is not to be expected that experience from all centers will show so complete a success with emetine bismuthous iodide as that which Mr. Dobell's paper records. But the resources of treatment are not exhausted when it fails. Some favorable reports have been made of a combined treatment with emetine hypodermically and ipecacuanha by the mouth; it seems likely that replacement of ipecacuanha by the double iodide in this combination might be even more effective. There are remedies again, such as the Chapparó amargosa of Texas, of which favorable reports come from America, especially for cases of the semiacute type which have resisted emetine. If the magnitude and importance of the problem created by these carriers are kept clearly in view, and the duty grasped of doing all that is possible to restore them to health and safety before they become distributed into civil life and lost to observation, a satisfactory solution should not be beyond reach.

It should be noted that treatment by emetine bismuthous iodide is useless in in-

fections by *Lamblia* and *Chilomastix*, and that, as a rule, *entamoeba coli*, which is believed to be a harmless parasite, though it disappears during treatment, almost invariably reappears afterward.

SOME STUDIES OF THEOCIN.

In the *Archives of Internal Medicine* of November 15, 1916, CHRISTIAN states that a fairly complete study of a small group of patients with acute nephritis or cardiorenal disease indicates that theocin in patients with slight or no edema has little or no therapeutic value, inasmuch as diuresis is not constantly produced, elimination of nitrogenous substances quite often is slightly if at all increased, and renal function is frequently decreased after giving theocin. In cardiorenal cases with marked edema theocin is of therapeutic value, because it produces, especially in conjunction with digitalis, an active diuresis with increased sodium chloride elimination, which decreases edema, a troublesome feature in these cases. Inasmuch as there is evidence that following an active diuresis renal function is depressed, an intermittent usage of theocin seems preferable to a continuous usage in cardiorenal cases with edema.

A REPORT OF THE USE OF STOCK VACCINE IN INFECTION BY THE BACILLUS TYPHOSUS, WITH AN ANALYSIS OF TWO HUNDRED AND THIRTY CASES.

In the *Journal of the Royal Medical Corps* for October, 1916, WHITTINGTON makes a useful report on this subject. He states that in the total vaccinated cases there were twenty-nine in which it appeared that vaccine had a definite good influence. Of these, twenty belonged to Classes 3 and 4—i.e., to those classes in which the prognosis is good. In other words, "good results" are more often obtained where good results can be expected by ordinary methods of treatment alone. On the other hand, the mortality rate and the average length of fever in these classes was slightly worse among the cases which had vaccine.

Among the cases belonging to Classes 1 and 2, in which the vaccine appeared to do good, none had severe lung involvement. Those cases which had much bronchitis or bronchopneumonia (the average severe case) ran the severe course which is usual, and vaccine appeared to be of no avail. To say that if the average severity of the cases treated had been less the vaccine would have had better results is merely to say, Whittington thinks, that the cases would then have done better anyhow. From all this it would appear: (a) That it is in just those cases in which the physician so much requires help that vaccine is so disappointing; (b) that vaccine neither shortens nor reduces the number of complications in even that class of case which is likely to do well; (c) that there is a decided suspicion that vaccine increases the incidence of hemorrhage.

The conclusion, therefore, is that the use of a stock vaccine in typhoid fever cannot be recommended as a routine treatment. Whittington would add that these conclusions are largely contrary to the impressions which he received during the treatment of the earlier cases. He had not then seen a sufficient number of similar cases which did well without vaccine, and being rather biased in its favor, he gave undeserved credit to this treatment.

THE TREATMENT OF DIABETES MELITUS BY PROLONGED FASTING.

CAMMIDGE in the *Practitioner* for November, 1916, writes on this theme. He points out that Allen and other observers found that, when nine-tenths or more of the pancreas is removed, an acute form of diabetes supervenes at once, but that when only seven-eighths or sometimes less of the gland is excised the onset is gradual, with longer or shorter periods of slight or intermittent glycosuria. Allen showed that dogs thus rendered diabetic could be kept for months, and apparently for years, in the best of health provided they were given a diet within their limit of tolerance. If this limit were exceeded, a permanent and fatal

diabetes ensued. Individual idiosyncrasies, differences in the permeability of the kidneys to sugar, and effects of nervous influences on the glycosuria, similar to those met with in human diabetes, were noticed as well. In the light of his experience with animals, Allen came to the conclusion that the cure of diabetes in man is possible and feasible, a position he maintained in a paper published in 1914, in which he outlined his proposed new plan of treatment.

Allen assumed that interference with the internal functions of the pancreas is the essential factor in all cases of diabetes, and that the condition is comparable to that existing in animals after partial resection of the gland, there being a loss of some of the glandular substance and a functional disturbance of the remainder in both. The structural deficiencies, whether due to surgical interference, as in animals, or to disease, as in man, cannot of course be made good, but since experiment has shown that the disturbance of function following operation in dogs subsides, and the power to metabolize more or less carbohydrate is restored, if a sufficiently long period of physiological rest is given, similar enforced rest of the damaged structures in the human subject may be expected to control the merely functional disturbances and bring about improved carbohydrate tolerance. As the necessary physiological rest can only be obtained by abstinence from food, fasting must be enforced until the total disappearance of glycosuria and hyperglycemia shows that the functional capacity of the pancreas is sufficiently restored to permit of complete utilization of the sugar formed by the patient from his own body protein.

Recent observations carried out by Allen and Du Bois in the respiration calorimeter suggest that this power may be acquired even in severe cases of diabetes as a result of fasting, and that later they are able to metabolize the sugar derived from the protein and carbohydrate of a carefully regulated diet also. The starvation naturally causes a loss of weight, but Allen main-

tains that this need cause no alarm, for, broadly speaking, freedom from glycosuria is attainable in all uncomplicated cases of diabetes before there is danger of death from starvation. Moreover, one of the aims of the treatment is to make the patient a physiological fit for his pancreas, which necessitates more or less reduction in the bulk of the body, according to the extent of the permanent injury sustained by the gland. When examination of the urine shows that it has been free from sugar for twenty-four hours feeding is commenced, but with a carefully selected and graduated diet, arranged so as to test the patient's tolerance for all the three chief food materials—carbohydrates, proteins, and fats—while avoiding overfeeding, and thus maintaining the freedom from glycosuria. No attempt is made to increase the weight; in fact, any gain that brings back sugar in the urine is immediately checked by a further fast, which is continued until the urine is again sugar-free.

Contrary to what might be expected from past experience, this method of treatment is not contraindicated by the presence of oxybutyric acid and acetone bodies in the urine. The increase in the acidosis, which occurs at first, generally subsides later if the starvation is persevered with, and eventually oxybutyric acid and excess of acetone bodies disappear in the majority of cases. The danger of coma is correspondingly reduced, and, as a rule, the administration of objectionable alkalies can be dispensed with at an early stage of the treatment. In order that the tendency to an excessive formation of acetone bodies, etc., may be kept under control when feeding is resumed, the fat content of the diet is maintained at a low level until a fair tolerance for carbohydrate has been established.

It is necessary that the principles of Allen's method should be thoroughly understood if full advantage is to be taken of his work, otherwise attempts to apply it in practice may meet with failure, which is likely to be attributed unjustly to de-

fects in the method. Education of the patient is always an important part of any form of diabetic treatment, and is here essential. In order that his intelligent co-operation may be gained, the aims of the treatment and the means by which they are attained should be clearly explained, and he should be instructed subsequently in the more important points concerning the properties and functions of different classes of food materials. Since the misplaced sympathy of relatives and friends often has a disturbing influence, the treatment generally answers best when carried out in a nursing home or institution away from such influences.

When Cammidge commenced using Allen's method, he kept all his patients in bed, but he finds that many do better when they are allowed to get about and occupy themselves. A brisk purge at the beginning of the fast tends to diminish the sense of hunger, and prevents the headache of which some complain. Plenty of water or soda water is also helpful. Black coffee and weak China tea in limited quantities spread over the day, are grateful and comforting, but in most cases it is advisable to avoid cream, for it often tends to prolong the fast unnecessarily, and may increase the tendency to acidosis. If the fast lasts more than a couple of days, he gives an ounce or two of bovril, made up to half a pint or a pint with hot water. He prefers bovril to beef tea or soup, for its composition is more constant. If there is serious acidosis, about 1 Cc. of whisky per kilogramme of body weight, in divided doses during the day, is advisable, but the average case seems to do better without alcohol. Occasionally one meets with a patient who reacts badly to starvation, complaining of nausea, sickness, and general prostration, or it may be that the condition of the heart and the blood-pressure, which should be carefully watched, contraindicate a fast sufficiently prolonged to remove entirely the glycosuria and hyperglycemia. If in such a case it is decided that fasting is the best treatment, it is advisable to terminate

the starvation temporarily, give a restricted diet for a week or two, and then try a further period.

THE USE OF MALT SOUP EXTRACT IN INFANT FEEDING.

In the *Journal of the American Medical Association* of November 11, 1916, HOOBLER in discussing the value of malt soup in infant feeding expresses the view that in order to clear the field of confusion and to save such an excellent food product from being wrongly employed, there should be a variety of methods devised for its use, depending on the results one wishes to accomplish. It is evident that any food made up according to one specific invariable rule is certain sooner or later to prove unsatisfactory in many cases.

The following is the formula usually printed on the container of one malt soup extract:

DIRECTIONS FOR PREPARING MALT SOUP.

Make two mixtures as follows:

Mixture 1. Take $3\frac{1}{2}$ ounces by weight (or $2\frac{1}{2}$ ounces by measure) of malt soup extract and dissolve in 22 ounces of warm water.

Mixture 2. Take $1\frac{3}{4}$ ounces by weight (or $2\frac{3}{4}$ ounces by measure) of wheat flour; mix with 11 ounces of milk and strain through a sieve.

Add Mixture 2 to Mixture 1 and boil three minutes, stirring constantly. Cool quickly and pour into clean bottles holding 6 ounces. Plug them tightly with absorbent cotton, or if corks are used they should be absolutely clean and close fitting.

Keep in a cool place.

We have in malt soup a mixture of boiled whole milk, raw wheat starch, malt soup extract, water, and an alkali in the form of potassium carbonate. We are asked to use this food designed by Keller for the treatment of enteritis cases and in other conditions without varying the formula. It is only natural that there should be many failures; the failures, however, should not be wholly charged to malt soup extract, but should, in Hoobler's opinion, be charged to the method of preparation.

It seems to him that von Liebig's original use of malt soup for the nutrition of normal infants, particularly those infants

whose weight is at a standstill and whose bowels tend to be constipated, offers a much greater field for the use of this excellent food product. When used in such cases, it has been Hoobler's custom to vary the Keller formula for the following reasons:

1. Boiled milk to his mind should not be given over long periods of time to children with a tendency to constipation.

2. Raw starch, or any starch cooked only from three to five minutes, should not be given to any infant, as it causes marked indigestion in many cases.

3. He does not think the proportion of one-third whole milk and two-thirds cereal water is the correct proportion in every case in which malt soup extract is indicated.

4. The use of the full quantity ($3\frac{1}{2}$ ounces by weight to 1 quart) of malt soup extract is too arbitrary a quantity. This amount will often cause an infant to have too many watery stools, producing marked fall in weight due to water loss.

5. The use of the alkali (potassium carbonate) is to his mind far more indicated in a formula designed for the correction of constipation than for diarrhea, since it has been shown by Dr. Holt that loose stools contain a larger proportion of potassium and sodium than constipated stools; hence in attempting to change a hard formed constipated stool to a soft loose stool, the use of potassium and sodium in the food are indicated. From the fact that in loose stools there is a much lower proportion of calcium than in constipated stools, it would seem on theoretical grounds that when one desired to use malt soup extract in conditions in which there are loose stools, the use of calcium would be more indicated than the alkali potassium or sodium. However, the presence of the alkali potassium is theoretically the proper form of the alkali in conditions in which stools tend toward constipation, and this is confirmed by clinical observation.

The method of using the malt soup extract which has been most satisfactory in

Hoobler's experience is one which gives much greater flexibility in the use of the various ingredients than can be obtained in following Keller's formula. This may be accomplished by adding the malt soup extract to a well-cooked cereal water, and this mixture added to raw milk in such proportions as one wishes.

1. Make up 1 quart of cereal water, using such quantity and kind of cereal flour as may be indicated. (The cereal water is to be cooked at least one hour in a double boiler.) When sufficiently cooked, and while still hot, add two level tablespoonfuls of malt soup extract. Stir until dissolved. Strain.

2. Select the kind of milk which it is desired to feed, and measure off the number of ounces of the milk which are to be fed during the twenty-four hours. (This will vary according to the age, weight, and condition of the infant.) Add to the milk as much of the cereal-malt soup extract as is required to make up the quantity to be fed in twenty-four hours. Add to this such amount and kind of sugar as may be indicated.

This formula serves for the first two or three days, and is in the form of a trial formula. If the child retains it and the stools become more frequent and softer, and there is a gain in weight, this formula may be continued. If the child retains it and there is no change in stools or weight, then gradually increase the malt soup extract. With each increase of malt soup extract one should withdraw an equal amount of the added sugar, provided one is near the carbohydrate limit, which, of course, varies in different children. By using this method of preparation one is at liberty to vary the amount and kind of cereal water used. The use of so much wheat flour cooked for such a short time is, in Hoobler's opinion, responsible for many failures in the use of malt soup. The wheat flour was added in the original formula of Keller for its constipating effect, as it was found when malt soup extract was used alone it was too laxative. In the

choice of the cereal flour used in connection with malt soup extract, one should be guided by the effect which it is desired to produce. If a marked laxative effect, then one type; if a constipating effect, then another; if intermediate, then still another group.

ACIDOSIS OF GASTROINTESTINAL ORIGIN.

In the *Journal of the American Medical Association* of November 4, 1916, CHAPIN and PEASE present statements in support of their idea that acidosis may result from the split products of proteins. They cite Vaughan, who, in a recent communication, has shown that casein yields a large percentage of the protein poison, and that this poison is in and of itself strongly acid. In animals, at least, it is entirely capable of causing acute or chronic poisoning when administered by the mouth, in the latter instance resulting in extensive fatty degeneration of the tissues. There is a tendency for the protein poison of the casein to combine with certain unbroken proteins, so that its physiologic action is diminished and its acidity wholly or in part neutralized. It is interesting to note that these poisons which are consequent on the splitting of casein are capable of giving a skin reaction in all persons to whom they are administered. Chapin and Pease found in the research of Vaughan an interesting support of their theory arrived at from clinical observations that acidosis of gastrointestinal origin is probably always closely connected with the proteins, and especially with the casein of milk. They have long believed, and, as their observations have become more extensive, this belief has changed to a practical certainty, that high protein feeding is not without its dangers and under certain conditions may become an actual menace to life itself.

If the proteins or the products of the breaking down of proteins form the etiologic factor in acidosis, recurrence of this condition might naturally be looked for.

Recurrences are not only observed so

near the first attack as to suggest the probability of a relapse, but are also seen over a period of weeks and months in a form which often suggests recurrent vomiting. In private practice they have had three patients who have suffered from cyclic vomiting for more than three years whose initial attack was diagnosed as intestinal intoxication, and who they now know suffered from acidosis. These children had previously been well and able to care for any kind of food. At times the intolerance for milk after such an attack is so great as to suggest an idiosyncrasy or an actual anaphylaxis for milk. It would seem that this intolerance for milk is due to the protein rather than to the sugar or fats of the milk. There was certainly no apparent advantage in giving sugar or fat-free milk. Whey was tried on only one occasion, for the result was such as not to be a temptation for further investigation. They should hesitate to assert that sugar was a cause of acidosis in view of the fact that of late a regular part of their treatment has been the use of glucose and thick gruels of barley, farina, and oatmeal.

The suggestion that the etiologic factor of acidosis is to be found in the decomposition of proteins is supported in an interesting manner by the frequent finding of large amounts of indican in the urine. Indican was not invariably present, but when found was often in very large amounts. They also discovered that commonly it was a rather transient finding, being found on one day and absent or nearly so on the next.

Having noted that these children improved rapidly if they lived for a sufficient length of time for a cathartic to act, Chapin and Pease were tempted to see what starvation would do. It was, however, with a considerable degree of hesitation that they instituted this measure, for they were familiar with the fact that mere starvation could be the cause of a very rapid increase of abnormal acids. Perhaps, somewhat contrary to their expectations, they have often noted a remarkably prompt improvement to follow on a period when nothing

but water and a solution of sodium bicarbonate was given. They have seen the stupor disappear and respirations fall almost to normal over night with this simple treatment. They do not consider that this improvement was entirely due to the sodium bicarbonate, for under other conditions of feeding recovery, if it took place at all, was much slower.

A very important part of their treatment has been a thorough cleaning out of the bowels, and especially of the small intestine. High colon irrigations and stomach washing did not accomplish much improvement if their efforts ceased at this point. Nearly always such a catharsis resulted in a very nasty, foul-smelling stool.

The use of sodium bicarbonate is to be recommended as a valuable temporary measure. It has much the same relation to acidosis that the cold pack has to temperature. It serves to keep the patient alive until other measures which require time become effective. It should be pushed until the reaction of the urine is alkaline or the blood shows a normal reaction. They have made it a practice to give the sodium bicarbonate in every possible way—by stomach, by the colon, subcutaneously, and intravenously—as the urgency of the symptoms seemed to indicate.

As they have tentatively connected attacks of acidosis with the milk—and perhaps most frequently with milk which contains an unduly high bacterial count—a very essential part of their treatment has been the elimination of milk from the diet for a considerable period of time. Their most successful cases have been those in which they have made a very slow return to the proteins. To an extent they have made vegetable proteins take the place of animal proteins; accordingly these children have been given thick gruels which were cooked for many hours. With the addition of sugar as the symptoms seemed to warrant, the caloric requirements for a time at least can be met.

The mortality rate among children suffering from an attack of acidosis is so great

as to make it a condition which should demand not only our interest but also our earnest investigation into its cause and treatment. They have suggested the close relation of acidosis to the milk supply, and especially to the decomposition products of the proteins of milk. They have outlined a method of treatment which is more satisfactory than any that they have previously employed, and which is based on the assumption of the close relationship of milk and this type of acidosis.

VALUE OF VACCINE THERAPY IN THE TREATMENT OF GUNSHOT WOUNDS.

SWAN (*Lancet*, Nov. 18, 1916) began vaccine treatment with some skepticism, but was convinced of its value as to clinical results. The large majority of infections are by bacilli of the colon or proteus group, pyogenic cocci, and anaerobic gas-forming organisms. The admixture of the proteus and the cocci paves the way for the anaerobe to invade the tissues in the immediate proximity of the wound and causes the breaking up of the muscle tissue and the partial digestion which is now recognized in these wounds. Swan has had a large number of his cases treated with the mixed vaccine of proteus and streptococcus, and has found this method of great assistance to the other methods of treatment carried out on ordinary surgical lines.

Bacterial examination should be made of both the superficial and deep aspects of the wound, for often in the latter are found the only indications of anaerobic activity. Where operation is practiced before vaccines are given there is usually pronounced pyrexia for one or two days. Vaccines prevent this. As a rule no operation should be performed without the knowledge of the interior of the wound afforded by a thorough radiographic examination, particularly as regards bone injury. Whilst this is being done an attempt to immunize the patient against the proteus and streptococcal infection should be made. The vaccination therapy is particularly valuable in the treat-

ment of complicated septic fractures of long bones and of fractures which open into joint cavities. These cases are treated by freely opening the wounds to secure adequate drainage, approximating the fragments and only removing those fragments which are undoubtedly completely separated. If needful, under vaccination displaced bones may be secured in place by silver wire or even bone plates, and this in the presence of local sepsis. In treatment of septic gunshot fractures which involve large joints, vaccine therapy holds an important place. Excision after vaccination is followed by prompt recovery and a movable false joint. These cases are also singularly free from secondary hemorrhage, due possibly to arrest of the digestive action in the tissues of the anaerobic coexisting infection.

STUDIES IN CEREBRAL FAT EMBOLISM WITH REFERENCE TO THE PATHOLOGY OF DELIRIUM AND COMA.

In a previous study of the tissues of fourteen persons who died following fractures complicated by fat embolism, an attempt was made to correlate the amount of fat present in the blood-vessels of the various organs, demonstrable by histologic methods, with the severity of the symptoms noted clinically, and the frequency with which the delirium occurring after fractures was ascribed to alcoholism was emphasized. In eight of the fourteen cases delirium tremens had been diagnosed clinically, although histories of alcoholism had not been definitely established in all the cases. The study was made on the bodies coming to necropsy from the Cook County and Presbyterian hospitals, Chicago.

Preparation of the tissues for the purpose of accurate estimation of the fat content is given in detail. Of each piece of tissue 50 sections were examined, and of these five sections containing average amounts of fat emboli were set aside for comparison. When these were collected they were carefully examined, and the amount of fat in ten fields of each organ was compared to the amount in ten fields of

the same organ of Case A, which was regarded as containing 100 per cent. Then the percentages of fat emboli in the several organs of each body were averaged and compared to Case A. The result was that the other thirteen bodies were found to contain 5 to 45 per cent of fat emboli in the organs. The fat emboli were most numerous in the lungs. In addition to the presence of fat emboli, there were certain circulatory alterations, as edema and hemorrhages, besides fatty changes of some of the organs. Edema of the brain was observed in seven; fat droplets in the blood stream noted at the time of necropsy in six; petechial hemorrhages, also noted at the time of necropsy, in the skin or organs in nine. In the lungs of all the bodies there were large numbers of fat emboli, and in half there were microscopic hemorrhages. In the heart muscle of 13 bodies there were fat emboli, microscopic hemorrhages in 12, and fatty degeneration in 6. In the kidneys of all 14 bodies there were fat emboli, fatty degeneration in 13, and microscopic hemorrhages in 10. In but six of the livers were emboli found, while in 12 there was venous engorgement and fatty infiltration, the latter being marked in seven. Fat emboli were also found in the brain, suprarenal, gastric mucosa, testis, and spleen in several instances.

The pathology of delirium and coma, the author states, has not been definitely established. From the data in the literature, there is evidence indicating that they may be caused by a variety of anatomical lesions in addition to those mentioned. Hoch has studied the brain of a man dying of delirium tremens and finds alterations in the pyramidal cells of the cortex cerebri, no mention being made of alterations of fiber tracts or evidence of focal necrosis.

In view of the profound disturbance in the central nervous system produced by the secondary changes of fat embolism, the author believes it is reasonably safe to conclude that these multiple lesions are intimately associated with the clinical manifestations of delirium and coma.—*Surgery, Gynecology and Obstetrics*, December, 1916.

VALUE OF LUMBAR PUNCTURE IN WAR WOUNDS OF THE SKULL.

LERICHE (*Journal de Chirurgie*, November, 1915) has had a large clinical experience with lumbar puncture to determine whether a wound of the skull was or was not penetrating. The fluid obtained was examined as to its color, its tension, its albumose, and its cytological content. A clinical trial showed that after such wounds the liquid would be clear, blood-red, bright rose color, or yellow. In simple wounds of the scalp verified by exploratory incision the liquid was clear in 42, in 4 rose-colored, and in 4 lemon-yellow. The colorless liquid is withdrawn two or three days after the injury. After twenty-four hours blood effused into the cerebrospinal fluid is hemolyzed, producing a yellow color which also promptly disappears. It is well known that after two to four days the liquid can become clear again, but that it remains yellowish for a long period. It is certainly surprising to find a rose-colored liquid in twenty-four hours. It follows that in 16 per cent of cases rose-colored fluid may be obtained when there is no penetration of the missile.

In 62 cases of wound of the scalp with bone lesion, without tear of the dura, the liquid was absolutely clear in 31; 4 times carmine red; 18 times rose; 9 times clear yellow. Clear liquid was found nearly always forty-eight hours after the wound, sometimes four or five days after. Rose-colored liquid was found usually, but not always, within two days. The red liquid was found always in about two days. The yellow liquid was found in a number of cases in two days, in a few much later.

In 14 cases trephining showed a large area of cerebral contusion. Clots were seen beneath the dura. Of these 14 cases, in three the liquid was clear, from which it can be concluded that when there is a contusion or fracture of the cranium the cerebrospinal fluid, though usually colored, may be clear. Even with an extensive contusion of the brain the fluid may be perfectly clear. Hence puncture is in itself of no value in determining for or against trephining. Of

six cases of small wounds of the open dura mater the liquid was clear once.

Finally, the author concludes that in simple wounds of the scalp the fluid is habitually clear, but may be colored (16 per cent); that in wounds with fracture or cerebral contusion the liquid is usually colored, but may be clear. Hence chromo-diagnosis is subject to considerable error.

As to tension, the normal fluid flows at the rate of about 60 drops to the minute. This is a rough clinical gauge, but should be supplemented by a manometer, which would give 10 to 15 cm. of water in the recumbent position; 8 to 10 more in the seated. The pressure is very little influenced by respiratory movements. Normal compression of the belly may raise the pressure as much as 8 cms. The manometer shows that high tension may be accompanied by escape of the fluid in drops, and that it may run out more rapidly under low tension. As the result of observation of 150 cases of hypertension the author concludes that hypertension develops very rapidly after traumatism; that it is inconstant in the bullet wounds; habitual in shell or grenade wounds. It is observed almost constantly in all those who are within the explosion zone of shells of large caliber. In big, open wounds the pressure is normal and low; in perforating wounds the same condition obtains. The author concludes that hypertension is not diagnostic in wounds of the head.

There exists a constant relation between the quantity of albumen and the quantity of cellular element found in the fluid, both depending upon the presence of inflammatory processes. As to cytological examination, a meningeal irritation produces first a lymphocytosis of no particular prognostic value. Polynuclear lymphocytes are distinctly grave indices. The author finally announces that lumbar puncture has no particular value either from the diagnostic or prognostic standpoint, but is priceless as a therapeutic agent in wounds of the head. He habitually punctures after trephining and believes that the lessening of pressure is favorable to healing. In extensive

wounds he punctures every three days. The excruciating headaches are cured at once. One case was punctured twelve times in a month. Puncture has been particularly serviceable when there were large contused cerebral areas. The liquid remains yellow color for a long time. There is severe headache, which is relieved only by puncture. In cases of cerebral hernia puncture is sometimes followed by the signs of increased sepsis, for the most part transitory.

DIAGNOSIS OF DUODENAL ULCER.

According to AUSTIN (*New York Medical Journal*, Nov. 18, 1916) it appears that a diagnosis of duodenal ulcer must be based largely upon the four factors of periodical and characteristic fasting discomfort, if not pain; on the presence of hypersecretion, particularly of the alimentary variety rather than the continuous; on the presence of occult blood in the stool; and on distortions of the first part of the duodenum, as shown by the radiogram. A short perusal of any series of case histories will soon show that all of these are practically never found in any one case. When, however, any two or three are evident, we may well forego the presence of the fourth factor. The relative value of the history, of the character of the pain and its intermissions, and the detection at some time of occult blood in the stool, appears to the author to be of the greatest importance. On account of the close similarity of symptoms of duodenal ulcer and functional hypersecretion, the former lose much of their significance, and dependence must be placed more upon physical signs than upon symptoms, and, as hypersecretion is present both as a functional disorder and as the outcome of ulcer, we are driven to the conclusion that occult blood in the stool and the distortion of the duodenum shown by the *x*-ray examination are the positive signs upon which we must largely base our diagnosis.

As far as the differential diagnosis is concerned, there is probably no condition which so closely simulates duodenal ulcer as cholelithiasis. Reference is not made to the

typical attacks of gall-stone colic with vomiting, but to the advanced forms, where adhesions have taken place between the gall-bladder and the duodenum. It is common, too, to find in cases of gall-bladder involvement, by reflex action, the same hypersecretion which we may find with the ulcer, and, secondly, there is often the tender point so characteristic of the latter. The periodicity of attacks of cholecystitis is well known. In his experience, one of the most distinctive points of difference between these two conditions is the slight trace of bile found in the urine when the common duct and gall-bladder are involved. Still, with the greatest effort at learning the truth, mistakes are often made. Primary cholecystitis has produced such marked symptoms of duodenal ulcer by adhesions to the duodenum that the operation was undertaken with that mistaken diagnosis, only to find that the primary condition was an inflamed gall-bladder with several small stones. On the other hand, a man presenting himself with jaundice following an attack of typical pain, though a diagnosis of cholecystitis was made, was shown at operation to have a duodenal ulcer which, by causing adhesions to the gall-bladder, had produced obstruction in the common duct. In typical gall-stone colic, however, the pain reaches a severity which is never found with duodenal ulcer. Another characteristic feature is that the distress produced by duodenal ulcer can generally be allayed by food or an alkali, or, as one patient put it, "the employment of a hot drink," but these means are never successful in checking a gall-stone colic. Again, a marked distinction can be made by the common experience that icterus, or at least bile in the urine, occurs with cholecystitis, while blood in the feces is found more particularly with duodenal ulcer, although there have occurred in his practice cases of cholecystitis associated with arteriosclerosis, in which occult blood was found repeatedly in the stool, owing probably to the rupture of some small arteriole in the intestinal tract.

The distinction between gastric ulcer situated near the pylorus and duodenal

ulcer is often impossible; in the writer's estimation, it is a mere refinement of diagnosis to reach such a decision, so that, like many practitioners, he merely refers to the lesion as a gastroduodenal ulcer, leaving it to the surgeon to differentiate. The ulcer inside the pylorus, or, in other words, on the gastric side, has been found by the author to be much more likely to produce gastric stasis, either through the redundancy of the scar tissue or by means of the pyloric spasm which so often accompanies it. As to the delayed pain or fasting discomfort, there is little or no difference whether the ulcer is inside or outside the pylorus. This does not exclude the possibility of saying that the ulcer is of gastric origin when it is situated in the lesser curvature or in the fundus, where, unquestionably, pain occurs much earlier.

Another difficulty which has apparently confused many diagnosticians is the differentiation of duodenal ulcer and appendicitis. In more than half of the operative cases which have come under his observation, the appendix had been removed without more than temporary relief of pain and discomfort. In many of the reports which have been received in regard to the condition of the removed appendix, it is plainly indicated that there was not a distinctly diseased organ; such terms as "moderately enlarged" and "slightly congested" being employed to designate its condition. Whether this similarity is due to the reflex relation of the plexuses, by which pressure applied above the navel causes pain at the appendix or not, or whether there is an associated causal relation between mild disease of the appendix and a duodenal ulcer, as has been held, is not certain. At least, whenever the appendix has escaped removal and patients are operated on for duodenal ulcer, the appendix, at the author's suggestion, has always been removed.

Moynihan calls attention to this associated lesion of the appendix and the duodenum, considering it probable that the duodenal ulcer is secondary to the invasion of the appendix and due to a toxemia arising from the latter. On the other hand, Schrijver

declares that, when both pathological conditions are found, the appendicitis is more likely to be secondary or oftener a coincident affection. The conjoint condition of duodenal ulcer and inflamed appendix has not been found by him with the frequency that it has been by Moynihan. His own opinion has always been that the diagnosis of diseased appendix is often made in error on account of the reflex relations of the plexuses involved, and that unless undoubted evidence of disease in the right lower quadrant is present, in the form of tenderness at McBurney's point, rigidity of the right rectus over it, and attacks of slight rise of temperature, it is much wiser to let the surgeon make the median incision and examine the region of the duodenum, at the same time removing the appendix, if the duodenum is found normal. At least, confusion occurs only with the so-called chronic condition or appendicitis larvata.

THE MECHANICS OF THE STOMACH AFTER GASTROENTEROSTOMY.

A careful paper on this subject by JACOBSON and MURPHY (*American Journal of Obstetrics*, January, 1917) concludes as follows:

That all patients examined in this series were uniformly well.

That gastroenterostomy openings properly made and placed do not obliterate.

That the gastroenterostomy openings functionate equally as well in the presence of either an open or closed pylorus.

That it is not necessary to artificially occlude the pylorus in gastroenterostomy.

That the gastroenterostomy opening to secure the maximum amount of drainage must be of ample size and placed as near the pylorus as possible, preferably in the antrum pylori. Such openings must not be made on the fundus of the stomach nor on the lesser curvature.

That gastroenterostomy is essentially a drainage operation.

That serious distention in the jejunum does not occur after gastroenterostomy; the food is seen to pass rapidly through the

many loops of the small intestine before it finally stops. Even in those patients who are entirely relieved of their former symptoms food can be forced backward into the stomach from the jejunum, and although this can be done easily, such regurgitations do not seem to make any difference.

NEW MERCURIAL PREPARATION IN THE TREATMENT OF SYPHILIS.

LAUTMAN (*Medical Record*, Jan. 13, 1917) states that an emulsion of 10-per-cent mercury benzoate and 2-per-cent quinine and urea hydrochloride in white petrolatum makes an excellent preparation for intramuscular injection in syphilis.

It is no more painful than any of the other preparations in use, and permits of giving three grains of the salt each week.

In twenty-five unselected and previously untreated cases the blood Wassermann was changed from a four plus to a negative in an average of eight weeks. The influence on the existing lesions was very favorable.

This communication is not intended to convey the impression that a negative Wassermann means that the syphilitic process has been cured or arrested, but the favorable effect on the Wassermann reaction would seem to indicate the process has been temporarily controlled.

Mercuric benzoate is the mercuric salt of benzoic acid, having the formula $\text{Hg}(\text{C}_6\text{H}_5\text{COO})_2$, plus H_2O . It belongs to what is known as the half-complex organic compounds, in which the element mercury is no longer free as an ion, but is in combination with an organic substance. As such it attacks proteins less vigorously, and is, therefore, considered less toxic. It contains about 45 per cent of mercury, and is usually employed in a $\frac{1}{2}$ -per-cent solution in normal saline, as recommended by Gottheil. Solutions of 1, 2, or even 5 per cent may be employed, but regardless of the strength of the solution, if the dose is increased beyond a sixth of a grain, painful inflammatory reactions are apt to ensue.

The preparation employed by Lautman is made by first grinding up quinine urea

hydrochloride in one hundred parts of white liquid petrolatum in a mortar and adding with careful trituration small quantities of the benzoate and oil. A perfect emulsion is obtained, which can be easily aspirated through a twenty-gauge needle.

The injections should be intramuscular after making certain the needle is not in the vein. The well-shaken-up emulsion is injected from an all-glass 2-Cc. syringe and the needle withdrawn. The site of injection is then massaged well for a few minutes to insure the distribution of the injected material. For cleaning and sterilizing the syringe, a little alcohol is sufficient.

Lautman usually gives one grain of the benzoate at a dose, and repeats this three times a week. What little pain there is usually is well tolerated; it generally starts about an hour after the injections, and lasts for five or six hours, leaving only on the following day a feeling of lameness on the injected side. Painful indurations rarely develop, and when present are due to the fact that the needle was not in the muscle.

THE MORBID ANATOMY OF WOUNDS OF THE THORAX.

HENRY and ELLIOTT (*Journal of the Royal Army Medical Corps*, November, 1916) summarize an excellent clinical study of this subject as follows:

The paper analyzes the cause of death and findings in 100 consecutive cases of fatal wounds of the thorax seen at base hospitals of the line of communication in France.

Of these deaths ninety-six were directly caused by septic poisoning. Only four died from hemorrhage, and three of these were cases of secondary hemorrhage induced by sepsis.

Bruising and laceration of the lung was found around the wound tract in nearly all the cases. The source of the hemothorax seemed as a rule to have been from vessels in the lung.

The laceration was not a serious lesion when accompanied by a hemothorax; but in the absence of the latter it was liable to

form the starting-point of a septic bronchopneumonia which, being unchecked, since there was no collapse of the lung, spread quickly and proved fatal.

Ordinary lobar pneumonia was never observed on the side of the injured lung, and it was found in the contralateral lung in only three cases out of seventy-eight that had hemothorax.

PROSTATECTOMY.

BORCHGREVINK (*Tr. XI North. Surg. Cong., Goeteborg*, 1916, July; quoted from *Surgery, Gynecology and Obstetrics*, January, 1917) contributes a paper that is not without interest to American surgeons. It is stated that the advances made during the last few years in the operation of prostatectomy consist in the two-stage operation (preliminary suprapubic cystostomy or residual catheter), careful attention to hemorrhage (tamponade or suture), good drainage (either by means of a wide suprapubic opening or by means of Pezzer's catheter), and especially in the employment of local anesthesia (either epidural, sacral, parasacral, or better still the direct anesthetization of the prostate and surrounding structures). Recently the author has also performed vasectomy for the prevention of epididymitis.

Of 114 cases, 16 were operated upon perineally; 7 died. The high mortality rate is due to the fact that the indications for the operation were carried too far. As has previously been mentioned by Israel, the perineal operation permits poorer drainage than the suprapubic. Seventy patients were operated upon suprapubically with a mortality of 7.3 per cent. In 20 cases a suprapubic fistula was made.

In three cases the operation was complicated by a bladder abscess, and in two others the seminal vesicles were removed with the prostate. No serious hemorrhage was present in any case, and if the operation is performed under local anesthesia it is almost bloodless. In the last 24 cases no tamponade of the bed of the prostate was done. Hemorrhage did not occur.

Complications during convalescence outside of the common ones (as pneumonia, bronchitis, embolism) were epididymitis, infection of the abdominal wound, urinary retention with fever, urethritis after introduction of a catheter, and stricture of the urethra. In one case the edges of the bladder wound closed up over the bed of the prostate, necessitating excision.

Indications for the operation are: catheter life, transient total retention, ischuria paradoxica, and prolonged and increasing urinary disturbances. In those cases in which the general condition is poor, in bronchitis, and in advanced arteriosclerosis, operation can be performed occasionally, but only without narcosis and after thorough preliminary drainage of the bladder and feeding of large quantities of fluids, and after the administration of urinary antiseptics. In severe urinary infection, or where there are symptoms of urinary insufficiency (polyuria, specific gravity below 1010, low nitrogen excretion), and in gastrointestinal uremia, operation may be performed occasionally. Cancer was found in 9.7 per cent (14) of cases. In seven cases the diagnosis was certain on account of the decreased mobility of the prostate. The operation in cancer should be performed only where there is a possibility of removing it entirely, otherwise symptomatic treatment should be given.

Tengwell reported 109 transvesical prostatectomies performed for urinary retention. In the first 50 cases lumbar anesthesia was employed—3-per-cent tropacocaine solution. This was discontinued, however, on account of severe poisoning cases and one death due to it, and was followed by local anesthesia in combination with light ether narcosis. The author filled the bladder with air principally, and used Kuemmell's after-treatment.

Among the 109 cases there were 12 deaths (11 per cent). In 80 cases a good result was obtained. The author operated if after a preliminary retention catheter treatment lasting two weeks there still was 200 Cc. of residual urine, or if the urinary attacks were severe; occasionally also after

acute attacks of retention for social reasons. All patients, however, who had prolonged retention or showed signs of urinary poisoning or infection of the urinary tract were treated with the permanent catheter for a long time previous to operation, and if the symptoms did not cease the operation was not performed. After the operation a catheter is inserted in the urethra in addition to the wide suprapubic drain, and irrigations of the urethra around the catheter are employed freely to avoid epididymitis. To avoid stricture sounds are introduced once a month for six months after the operation. In one case the bladder wall had closed completely over the internal urethral orifice.

In nine cases a probable diagnosis of cancer was made clinically. In cancer of the prostate the radical operation by the perineal route should be performed; the author, however, resorted to palliative treatment only.

Ekehorn stated that he had a mortality rate of 11 per cent, the patients themselves demanding the operation. The time of cure is about thirty days. The result is good; 16 patients do not have to void urine at all during the night, 12 patients only once, 7 patients twice, and 6 more than twice. Infection of the urinary passages is no contraindication. Cancer of the prostate is common; as it is difficult to diagnose, early operation is necessary. Recovery in cancer is just as rapid and the functional result is just as good temporarily as in the other cases.

Euren performs partial removal occasionally in parenchymatous hypertrophy. He always employs the transverse incision through the skin and fascia (occasionally also a small incision through the muscle), transverse incision through the bladder, and drains from one corner of the incision. In infected cases irrigation of the urethra and bladder is employed before operation.

Von Holst analyzed the material of Professor Dahlgren from the Sahlgren Hospital, including 142 cases of prostatic hypertrophy. Of these 42, or 29.6 per cent, were operated upon under local anesthesia, the

others with lumbar anesthesia. Twenty-eight were operated transvesically, 3 transperineally, 10 with cystostomy, 1 with vasectomy. The mortality rate with transvesical prostatectomy was 11.9 per cent. Of the non-operated cases 8 per cent died. The duration of convalescence was twenty-nine days. The functional results were good—8 patients do not urinate at all during the night, 3 once, 4 twice, and 2 three times.

Bull performed 40 prostatectomies (two perineal) with a mortality rate of 10 per cent, and 12 cystostomies with a mortality of 50 per cent. He operates under local and sacral anesthesia. Complications after operation are frequent (75 per cent). Cancer was found clinically or by the microscope in 15 per cent of cases. If the diagnosis of cancer is certain, only a cystostomy is performed. The hard consistency of the prostate is the most frequent symptom.

Bauer examined 22 out of 27 extirpated prostates and found cancer in five cases (22 per cent). Although the material is small it nevertheless shows about the same percentage of cancer as do larger series. One must therefore figure on a fair percentage of cancer cases in all prostatectomy operations even though the clinical symptoms point to a simple hypertrophy.

Rovsing stated his belief that it is certain that the hypertrophy arises from the paraurethral glands as the prostate surrounds the hypertrophy, and the patients therefore do not become impotent after the operation. He does a total removal more frequently than formerly, but has had only 60 cases so far with 10 fatalities. In 11 operated cases the result was bad (retention, bladder-stone, stricture of urethra). He has performed 130 cystostomies, however, and he always advocates that this should precede the removal of the prostate, it being especially indicated in pyelitis to decrease the virulence of the infection. If the patient desires it later a removal operation may then be performed, as the operative mortality is from 10 to 20 per cent, and recovery can never be guaranteed. The

aseptic cases with kidney insufficiency frequently deceive one and are best treated with cystostomy. He protested emphatically against the filling of the bladder with air, on account of the danger of embolism.

Schilling has performed 30 prostatectomies. After the operation three cases of cancer were found among them. He is very well satisfied with parasacral anesthesia and finds local anesthesia of the prostate too complicated. The results are good. In cases of hemorrhage he tampons for fifteen minutes. The bladder wound is closed completely around a large drain which empties into a bottle, and the drain is removed after six days. In three cases he closed the bladder primarily without drainage.

Wessel operated upon 20 cases without a death, but chose for operation only cases which were not infected. Cases of the soft succulent form which bleeds easily were helped considerably by a vasectomy, as mentioned by Rovsing. The prostatic part of the urethra is not only lengthened by the hypertrophy, but it is also dilated (Lengdorf) so that a pocket forms which is open toward the bladder and easily leads to a cystitis.

Borelius demonstrated a large prostate—455 gm.—removed through a transverse incision under sacral anesthesia in combination with local anesthesia.

Key does not consider the operation for clinically diagnosed cases of cancer as absolutely hopeless if all the fascia and connective tissue of the pelvis are removed. Of three operated cases, one has lived one and one-half years without recurrence, and two for one year with recurrences.

Floderus reported 50 transvesical prostatectomies with a mortality of four, or 8 per cent. In three cases the operation was very prolonged on account of adhesions.

Forsell employed local anesthesia of the prostate in 57 cases, with seven deaths. Before enucleation of the prostate the author made a circular incision of the bladder mucosa, and with this procedure never had a stricture result. He never employed a residual catheter after the operation.

Tandberg extended the indications for the operation and therefore also has a high mortality. Among 14 cases there were five cases of cancer. In one case the prostate weighed 500 gm. Local anesthesia had been disappointing, and he therefore employed ether in preference. All operated patients except one preserved their sexual functions.

Backer-Groendahl mentioned the methods of determining the function of the kidneys before operation. By means of curves he showed the diuresis, nitrogen excretion, specific gravity, albumin, and phenol-sulphonaphthalein excretion. A definite decrease in the excretion of these substances occurred, especially of the last, after a cystostomy, as the cessation of the retention influences the kidney. A later prostatectomy produced no shock.

Kuren criticized the employment of cystostomy. He considers it an unbearable procedure requiring careful nursing and later causing infection of the urinary passages and stones.

Sandberg stated that while most operators control hemorrhage with tampons, he accomplishes this with adrenalin solution through a Nélaton catheter; later daily irrigations to remove coagula.

Tengwall answered Rovsing's argument by saying that the unpleasant flooding of the operative field by fluid can be safely avoided by the employment of air. If the operation were performed only on the non-infected, only a very few cases would be operated.

Rovsing contended for cystostomy and explained the after-treatment. The catheter must be changed about every six weeks; in changing it one risks infection, therefore it is necessary to follow the introduction of it with an injection of lapis, otherwise no irrigations should be employed. With the first signs of infection another injection of lapis should be given. Those patients who find a cystostomy objectionable can always have an ectomy performed later.

Borchgrevink closed the discussion by again recommending the two-stage operation. The infection may first be taken

care of by a cystostomy, not in the sense of making the urine sterile, but to dissipate the general intoxication. Nevertheless, after a successful cystostomy operation the ectomy may be followed by a transitory uremia. The infection of the abdominal wound can be avoided if it is left wide open or drained well. In regard to hemorrhage he recalled Israel's words that if one did not desire any one need not have any. The question of operating for cancer is a problem; some time may be gained for the patient.

CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS.

SIR DAVID BRUCE (*Lancet*, Dec. 2, 1916) concludes his study of this subject as follows:

In the 195 cases of tetanus under review the mortality was 49.2 per cent.

Cases with a short incubation were more fatal than those with a longer incubation.

The greatest number of cases occurred on the eleventh day after the wound.

There are no allusions to the use of anti-tetanic serum as a prophylactic in home military hospitals.

In regard to the therapeutic effect of antitetanic serum the evidence as collected from the 1915-6 reports is not conclusive.

In the cases under consideration the advantage of the intrathecal route over the subcutaneous or other routes is also not conclusive.

There is no evidence that any benefit accrued to the cases treated by carbolic acid or magnesium sulphate injections.

With our present knowledge the treatment of a case of tetanus might be as follows:

Place in a quiet, darkened room under the care of a sympathetic and capable nurse. "Rest, sleep, and food" are looked upon as the first essentials of treatment.

If thorough surgical treatment is carried out on wounds from the beginning, so as not to allow the presence of necrotic tissues or foreign bodies, the number of cases of tetanus should sensibly diminish, if not al-

together disappear. But if a case does occur, then the wound should not be actively interfered with until the tetanic symptoms have subsided.

The intrathecal injection of large doses of antitoxin, of high potency if available, should be begun at once, and supplemented by intramuscular and subcutaneous injections.

In addition, if necessary, the patient should receive sedatives, of which morphine in $\frac{1}{4}$ -grain doses and administered every four hours is perhaps the most suitable. Chloral, chloretone, and other sedatives are also given by the mouth or rectum.

TUMORS OF THE SPINAL CORD.

BECKMAN (*Journal-Lancet*, Jan. 15, 1917) reports 18 cases of tumor of the spinal cord. Two were extradural; seven were intradural but extramedullary; six were intramedullary. There were two angiomas and two cysts. The duration of symptoms varied from one to fourteen years, the latter in the case of a cyst of the dorsal region. There were seven cases of glioma, three of sarcoma, three of angiomas, one of psammoma, one of fibroma, and one of tuberculoma. There were three deaths, three cures, four improved, and five unimproved. In two there was questionable improvement.

Beckman concludes that many tumors of the spinal cord are overlooked because the average physician is not familiar with the methods of neurologic diagnosis. In order to obtain better results with fewer cases of permanent paralysis, it is necessary that these tumors be diagnosed early and operated on during the early stages. Obviously, pressure maintained on the spinal cord for a considerable length of time produces a degenerative process in the delicate cord structures from which there is no regeneration. He believes that in many instances in which the diagnosis of cord tumor is not absolute, but in which there are level symptoms, a laminectomy should be advised. Root pains are a common symptom in most

cord tumors. In some instances the pain may be so slight, or the predominance of other symptoms at a later period may so overshadow the previous pain, that it is entirely forgotten by the patient, and can be obtained only by the most careful questioning. Level symptoms are always present in the later stages, although tactile, pain, and temperature sense may not be involved to the same degree. In some instances, one of these may be absent, and the tumor may then be located by the definite level of the others.

Beckman urges a more careful examination in neurologic conditions and a more frequent and earlier laminectomy in cases of suspected tumors as the only method of preventing crippling due to long standing pressure of tumors on the cord.

A STUDY OF THE CEREBROSPINAL FLUID IN FIFTY CASES OF CEREBROSPINAL SYPHILIS.

SUTTER (*New York State Journal of Medicine*, January, 1917) believes that every case of syphilis should have a lumbar puncture made and fluid examined. This examination should include the estimation of the pressure, the globulin determination, the cell count, Lange's colloidal gold chloride reaction, and the Wassermann reaction. The cell count should be made as soon as the fluid is removed to prevent error from hemolysis.

The study of the cerebrospinal fluid is of greater importance in nervous cases than that of the blood serum, for it shows not only that the patient has syphilis, but also indicates that the nervous system is implicated. A positive reaction in the cerebrospinal fluid is present only when the nervous system is involved. In syphilis the Wassermann reaction will usually be positive, the globulin in excess, the gold chloride reaction present, and the cell count increased above six per c.m.m., the number depending on the meningeal irritation. If the syphilis is confined to the brain alone, the Wassermann reaction in cerebrospinal fluid may either be negative or fleeting,

whereas the blood serum is generally positive. The reason for this is the stasis in the lower part of the cord and the small amount of active communication between the fluid of the brain and spinal fluid.

The cytology is a very important element in the study of the cerebrospinal fluid. When studied differentially it gives some insight into the severity of the meningeal reaction. The Wassermann and other reactions are of value in determining the etiology of the affection, but the intensity of the meningeal affection is usually more clearly shown by the cytology. Variation in the cell count is sometimes found at intervals in any stage of the disease. Sometimes high or low counts persist for considerable lengths of time in various stages of the disease. A large number of counts were made by Dr. Paul Weston, of the Warren State Hospital, Pa. He found that they varied from day to day and without apparent reason. In all instances the counts were made within a few minutes of taking the spinal fluid, so that no opportunity for cytolysis was given.

The dividing line between normal and pathological spinal fluid appears, according to statistics, to be about five or six cells per c.m.m. In *tabes dorsalis* the count is never higher than about 100, usually from 40 to 60. This number diminishes in the declining stages of the disease.

The globulin reaction gives us a means, in doubtful cases, of differentiating between functional and organic affections of the central nervous system, but not between luetic and non-luetic conditions. Excess of globulin always means organic disease, while its absence, like most negative findings, is not of equal value in absolutely excluding organic conditions. Real significance in the findings in differential diagnosis becomes apparent only when the presence or absence of the reaction is carefully construed with a full knowledge of all the clinical facts in the case. The Noguchi butyric acid test seems the most reliable and delicate. It is always present when the other globulin reactions are positive.

The Lange colloidal gold chloride reaction is a useful adjuvant to the Wassermann and other tests in the cerebrospinal fluid. It is present in most cases of syphilitic involvement of the central nervous system. In general paresis there is a distinct curve, which is known as the "paresis curve." In *tabes dorsalis* the reaction is not quite so characteristic and is present less frequently. The reaction is more delicate than the Wassermann, the cell count, or the globulin content. It is nearly constant in syphilis of the central nervous system; it is extremely sensitive and is reliable when positive; the amount of fluid used is quite small (0.2 Cc.); definite conclusions are reached with ease and rapidity; the margin of errors is exceedingly small; it runs parallel with the Nonne Phase I and Noguchi and bears relationship to the Wassermann reaction, which is constant. The chief advantages in this reaction are the small amount of fluid, its technical simplicity, the sharpness of the reaction, and its delicacy. The reaction is particularly useful in differentiating incipient general paresis and neurasthenic disturbances in a syphilitic.

The Wassermann reaction, when unmistakably positive in the cerebrospinal fluid, is highly characteristic of the syphilitic process, and, generally speaking, is of greater significance than the blood Wassermann when it is desired to establish the nature of a given nervous disorder. The positive reaction, because of the possibility of many technical errors, is of more value than a negative reaction. The chief source of error is in the employment of various techniques and reagents by the different serologists.

The positive Wassermann reaction is now a more constant finding in the cerebrospinal fluid since a larger (five times) quantity of fluid is used in performing the test. Sometimes the reaction, negative with the smaller amounts, is positive with the larger amount. Hence a negative response should not be accepted as decisive until the technique with the larger amount has been

used. The use of such large amounts of spinal fluid does not tend to produce positive findings in non-luetic cases.

Signs and symptoms in cerebrospinal syphilis are quite manifold and varied. This is due to the variation in site of involvement and to the character which the process exhibits. In the cerebrospinal fluid we find a more constant picture. Almost every case shows a strong globulin reaction, a positive gold chloride reaction, and a positive Wassermann reaction.

Eleven cases of clinically diagnosed tabes dorsalis appear in the author's series. Most of these examinations were made after the patients had been given considerable treatment. This alters the findings somewhat. The globulin reaction was present in seven cases, weakly positive in two, and negative in two out of the eleven cases. The cell count increased in eight, normal in one, and border-line in two cases. The highest count was 55. The Lange gold chloride reaction in this series of eleven cases did not show any characteristic curve. Five cases showed some color changes, but no marked color changes in the tubes were seen except in cases 14 and 20. Both of these cases also showed a large increase in globulin and in the cell count.

The Wassermann reaction was positive in the serum in five cases and in the fluid in seven out of eleven cases. In one case it was negative in the serum and positive in the fluid. In all the other cases the findings were consistent. One case had decided ataxia, but no other clinical signs. It was diagnosed as irregular tabes.

The strongest and most characteristic reactions were seen in a series of 20 cases of paresis. All cases showed well-marked color changes in the Lange colloidal gold chloride reaction. The typical "paresis curve" was seen in all the tests. The highest cell count was 50. It was normal in two cases, and there was only a slight increase in another. The globulin was positive in 16 cases, weak in two cases, and negative in two cases. The Wassermann reaction was positive in all but two cases.

One case showed negative reaction in the serum and positive in the fluid.

Nine cases of tabo-paresis were studied. In all cases all the tests were positive. The cell count varied from 10 to 70. The globulin was strongly positive in all but one case. The Wassermann reaction in this case was positive in one laboratory and negative in another in both serum and fluid. In one case the clinical diagnosis was irregular tabes. In all other cases observed the clinical signs were well marked.

The clinical picture of paresis, especially in those cases which come under observation in private practice, is most commonly of the tabetic type, and is better known as tabo-paresis.

In the light of our present knowledge lumbar puncture with cerebrospinal fluid examinations is demanded in all cases of syphilis. With proper technique and careful interpretation of the findings, the examination of the cerebrospinal fluid, although not always conclusive, is of unequaled and incalculable diagnostic value.

OBSERVATION ON BLOOD-PRESSURE DURING OPERATION.

MOOTS (*American Journal of Obstetrics*, December, 1916) observes that in some of the most renowned teaching centers blood-pressure readings are taken only of systolic pressure, and this by individuals whose lack of professional training prohibits all possibility of any intelligent idea of myocardial, endocardial, or vascular changes, or the relation of these changes to pressures. Diastolic pressure he defines as that existing in the artery under observation during the diastolic pause just preceding the succeeding cardiac systole. Taken alone it is the truest index of arterial tension. No matter what the systolic may be, if the diastolic is high there is a true hypertension of the vessels, but if the diastolic is low we are dealing with a hypotension, and this is true irrespective of the systolic pressure. Pulse pressure is the force necessary to move the column of blood in the artery.

It represents the force exerted by the contracting ventricles in excess of the diastolic pressure.

Systolic pressure is the sum total of pressures existing in the artery; it represents the diastolic pressure plus the pulse pressure, shows the energy being expended by the myocardium at a given moment, and is therefore very variable. It may be stirred by psychic influences, by physical stress. Taken alone it is not nearly so important as diastolic pressure. Combined with other pressures it is invaluable, as it clearly shows the endeavor that the heart is making to maintain circulatory equilibrium. By pressure ratio is meant the percentage obtained by dividing the pulse pressure by the diastolic pressure. For example, a case has a systolic pressure of 120 and a diastolic of 180; the pulse pressure is 40 and the ratio of pulse pressure to the diastolic is 40 to 180 or one-half, which means 50 per cent of the diastolic pressure. This pressure ratio is really an important matter, as it represents "the relationship existing between the kinetic energy expended by the cardiac contraction in moving the blood column and the potential energy stored in the arterial walls and column of blood which they contain."

The ratio may be normal between 40 and 60 per cent. The pressure ratio is either low or high, and there is reason to apprehend danger. The auscultatory method is the one upon which dependence should be placed. This will forecast an approaching storm long before it can be determined by any other method. Unvariable pressures during operations are the result of most painstaking efforts on the part of the surgeon, anesthetist, and every one concerned in carrying out a shock-free technique. As a result of his observations Moot concludes that the systolic pressure alone is of very slight, if any, value. The diastolic pressure alone is of much more value than the systolic alone.

The pressure ratio is the essential factor, and offers the earliest danger-signal.

There are certain elements in technique

which have a marked constant effect upon the pressures. These are as follows:

The psychical or emotional state of the patient; the position of the patient upon the table, the extreme Trendelenburg being the worst.

Overdosing by the anesthetist; the amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with scissors, the hands, and other dull instruments; the packing of large gauze packs, instead of rubber tissue, into the abdominal cavity.

The preservation of the fluids in the body up to the hour of the operation, this being absolutely necessary to maintain the usual pressures.

RUPTURE OF THE CÆSARIAN SCAR.

RONGY (*American Journal of Obstetrics*, December, 1916) concludes his paper as follows:

Spontaneous rupture of the Cæsarian scar occurs in about 3 per cent of cases. In most instances rupture takes place during labor. It does take place not infrequently during the latter half of pregnancy, especially in the last six weeks.

We have no means by which we can judge the strength of the scar. Rupture will occur in cases which run an afebrile course and in which union of the wound is apparently by first intention.

One-third of all patients who undergo subsequent Cæsarian section show evidence of inflammatory reaction in and about the uterine wound. The result in such cases is a weakened scar.

Proper suturing of the uterine wound and exact approximation of the edges will not always prevent subsequent rupture of the scar.

The mortality rate of repeated section is smaller than that of primary Cæsarian section, because these patients are more carefully watched.

A patient who has once had a Cæsarian section should not be allowed to go through a tedious or severe labor. If labor does

not progress rapidly, Cæsarian section should be performed.

When advising a patient to have a Cæsarian section, the management of subsequent pregnancies should be taken into consideration and discussed with one of the members of the family.

As a general rule, it may be stated that fully 75 per cent of women who have had a Cæsarian section are delivered by repeated section during their subsequent labors.

The obstetrician should always bear in mind that Cæsarian section creates a new problem for the woman, and therefore he should carefully weigh the indications before he decides upon the abdominal route. He should remember that the dictum, "Once a Cæsarian, always a Cæsarian," holds true in fully 75 per cent of cases.

Finally, it is his firm belief that Cæsarian section is very frequently resorted to in cases which should be delivered by other methods. Abdominal section is a major obstetrical operation. Surgeons and gynecologists, who have no obstetrical knowledge, are not competent to make a proper diagnosis and should not perform it. Obstetrics, in order to gain the respect of both the community and the medical profession, should be practiced only by those who have had a proper training. The interest of the pregnant woman will then be properly safeguarded.

MISTAKES IN DIAGNOSIS OF ECTOPIC PREGNANCY.

LYTLE (*New York Journal of Medicine*, January, 1917) states that in a series of ten cases admitted to the New York Hospital four of them were incorrectly diagnosed by the hospital staff. It is estimated that in at least 50 per cent of them the physician fails to make a correct diagnosis. The written descriptions of the disease as a rule describe it as it appears after severe internal hemorrhage has taken place, which is quite a different picture from that which obtains in the pretragic stage, before collapse from hemorrhage has occurred.

These cases if treated early present a very low mortality.

Moreover, they are sufficiently frequent to make them an emergency likely to be found by every physician doing general practice. Among the cases presenting themselves at the out-patient department of Leland Stanford University, one in 131 cases of pregnancy was ectopic. In another large series of cases of pregnancy there was one case of ectopic pregnancy to sixty-two of uterine pregnancy, and Noble has estimated the condition present in 3 or 4 per cent of all the laparotomies done by him.

One of the most common mistakes in the diagnosis of ectopic pregnancy has been the diagnosis of uterine abortion, impending or incomplete. Of the 90 per cent who consulted a physician before rupture, in the series of 130 cases reported by Harris, a large proportion were told that an ordinary abortion was threatened, was occurring, or had occurred. Another kind of mistake is that of making the diagnosis of acute appendicitis first, when the patient complains of abdominal pain, with vomiting, but it should be emphasized that it is important to think also of ectopic pregnancy in all cases of abdominal colic in females in whom pregnancy is possible.

The writer asks: If then, we are not to require these severe symptoms to remind us of ectopic pregnancy, what are the symptoms that should make us suspect the condition?

Uterine hemorrhage is one of the most significant features.

We should be suspicious of flowing that is four or five days to a month overdue. This is usually scanty in amount and is spoken of as spotting. In many cases it is reddish-brown and does not clot, while in others it appears to be like a normal menstruation overdue. One must not be misled, however, by the fact that the catamenia are not overdue. In one series of cases only 50 per cent had missed a period. Nevertheless, any irregularity in bleeding should be a subject for close inquiry. The

character, amount, and duration of any flowing, whether before or after the date on which menstruation is expected, should be most closely observed. Besides the flowing, pain is a most important symptom. It is usually the only important subjective symptom before there has occurred any interruption in the condition of the fetus in the tube. It is present in over 90 per cent of the cases, and is usually located over the seat of the disease. Sometimes it is constant and sometimes colicky. It may be absent when the patient is quiet, but present when the patient moves about the room. In the unruptured cases it is likely to be mild, as it is also in the cases of tubal abortion, while in the cases of rupture it is often a very severe pain, cutting in character. The discovery of a tender mass on the same side of uterus as the pain adds to the certainty of diagnosis. Faintness is sometimes experienced, even before rupture, and fever is the rule after blood has leaked into the abdominal cavity. Many are the combinations of conditions and symptoms in different patients. The diversity is so wide that mistakes are bound to occur. "No pelvic condition gives rise to more diagnostic errors," to quote DeLee.

Mistaken diagnosis will be less frequent, however, when our mental picture of ectopic pregnancy is not the classical ruptured ectopic, but when we visualize these cases as they are before rupture, when the symptoms are mild and seem less urgent.

ESOPHAGECTASIA.

SHAW and Woo in a paper under this title give their opinions as follows (*Lancet*, Dec. 2, 1916):

Such cases in the past have been frequently referred to as examples of cardiospasm, by which is meant that quite independent of any organic lesion spasm occurs in the circular muscular fibers round the cardiac orifice of the stomach (cardiospasm). The obstruction caused by this phenomenon leads to a dilatation of the esophagus and to a variable amount of hyper-

trophy of the muscle of the tube, food being retained in the esophagus, irritating its walls, leading to chronic inflammation, and assisting in bringing about dilatation. This might be looked upon as a sort of positive cardiospasm, but unfortunately there is no proof histologically that there is hypertrophy of the muscles of the cardia such as might be expected if spasm had occurred.

The outstanding features which should attract the physician's attention to these cases are as follows: When food does not seem to pass down the esophagus properly it "sticks" behind the breast-bone, and may even cause pain in the epigastrium; further, this "sticking" of food has been noticed frequently for a few or many years. Relief is got by making the food come back, the patient securing this by tickling the fauces, attempting the act of vomiting, or by coughing, or by taking a deep breath. It will be found that the taking of a meal is followed by a feeling of difficulty of breathing, actually described by some patients as a feeling of stifling or of asthma, which is only relieved by again bringing up the food. In some cases a condition of persistent cough is provoked by taking a meal, as if the dilatation of the esophagus irritated the lung and caused a reflex cough, the combination of cough with attacks of respiratory embarrassment provoking in these cases the opinion that the patient is suffering from true bronchial asthma. When studying the transit of a bismuth meal by means of *x*-rays in cases of so-called "dyspepsia" it is very necessary to observe the shadow in the esophagus as well as in the stomach and intestine; two at least of the above cases were missed from want of this precaution. These patients soon learn that the best way to obviate symptoms is to masticate very thoroughly and to spend some extra time over their meals, avoiding all "bolting." If this plan fails they generally betake themselves to liquid diet, which they can deal with comfortably.

REVIEWS.

THE GROWTH OF MEDICINE. From the Earliest Times to about 1800. By Albert H. Buck, B.A., M.D. Yale University Press, New Haven, 1917. Price \$5.00.

Dr. Buck will be remembered by older practitioners as the editor of the earlier editions of "The Reference Handbook of the Medical Sciences," and by former students of the College of Physicians and Surgeons of New York as Clinical Professor of Diseases of the Ear in that institution.

The present volume is the first work published by the Yale University Press under the Williams Memorial Publication Fund, a fund founded by a medical graduate of Yale University whose father and grandfather before him had been graduates of the same school. As is well pointed out, there are not many physicians who possess even a slight knowledge concerning the manner in which the science of medicine has attained its present power as an agency for good, or concerning the men who played the chief parts in bringing about this great result. This is in part due to two causes: First, the student's need of keeping up with modern medical progress prevents the medical man from studying medical history; and second, much medical history is presented in such a dry and uninteresting form that it requires an effort to study it, when if it was properly placed before the reader it would give him hours of recreation. It is to fill the last need and to provide the profession with a reliable and interesting story that Dr. Buck has prepared this volume, which, in large type and well leaded, covers nearly six hundred pages and deals with medical history up to 1781. At the close of the volume there is a list of the more important authorities consulted, and throughout its pages there are foot-notes which give additional references.

The text is divided into three parts. The first contains sixteen chapters and is devoted to Ancient Medicine, the sixteenth and closing chapter being entitled "The Influence of Christianity upon the Evolution of Medicine." The second part deals

with Mediæval Medicine, starting out with "The Condition of Medicine at Byzantium During the Early Part of the Middle Ages," and closing with a chapter devoted to "Pharmacy, Chemistry and Balneotherapeutics." The third part deals with "Medicine During the Renaissance," beginning with a discussion of "Important Events that Preceded the Renaissance," discussing "The Founders of Human Anatomy and Physiology," and closing with a chapter upon "The First Appearance of Syphilis in Europe as an Epidemic Disease," with the subjects of "Medical Journalism" and "The Beginnings of a Modern Pharmacopœia." There are also twenty-eight illustrations in the volume, either of individuals or of buildings closely associated with advances in medicine.

The book is evidently the result of a pet study on the part of its learned author, who well along in the eighth decade of his life has had the energy and vigor to present in accurate and readable form the facts which his professional brethren ought to know.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. Edited by H. R. M. Landis, M.D. Volume One. Twenty-seventh Series, 1917. J. B. Lippincott Company, Philadelphia.

This volume, like its predecessors, contains articles upon Therapeutics, Medicine, Dermatology, Psychiatry, Public Health, Surgery, closing with an article entitled "The Progress of Medicine During the Year 1916."

The articles under Treatment consist in one by Dr. Vincent Lyon upon the Medical Treatment of Gastric and Duodenal Ulcer; another by Dr. R. H. Boggs upon The Treatment of Epithelioma by Radium; and a third by Dr. Curran Pope upon The Medical Treatment of Poliomyelitis. In view of the recent epidemic of this disease, we turn to the pages of Dr. Pope's article with some interest. He speaks of certain experiments which lead him to believe that by the use of non-specific protein substance

it is hoped that he will be able to overcome the influence of the filterable protein of this disease, but adds that at present he is not prepared to state the exact terms upon which this hope is based. Without stating that he has had considerable experience he looks with favor, apparently from a review of the literature, upon the use of so-called serum treatment—that is, using the serum obtained from persons who have already had the disease—and states that there are few drugs which seem to possess any value, save that free purgation should be promptly instituted and laxatives continued during the acute stage of the disease. The reasons for this are not stated. Again he quotes the use of intraspinal injections of adrenalin as recommended by Meltzer. He also advises fomentations applied to the spine at a temperature of 140° to 150° for ten minutes, followed by cold sponge or compress, and again the use of high candle-power electric light, which is not only an analgesic, but also produces a hyperemia, which in turn, he thinks, is followed by a secondary anemia which relieves the congestion of the cord. This seems to us a rather unusual proposition. He advises against the use of plaster-of-Paris casts and all other supports in the acute stage. We are surprised to find he recommends the electrical treatment of poliomyelitis as soon as the paralysis appears, before the temperature is normal. This is certainly in opposition to the opinion of the majority of writers. We are glad to note, however, that he prohibits the use of the faradic current and states that he employs the genuine sinusoidal, using on alternate days the mixed galvanism and faradism. It is certainly wise when faradic current is employed to use the smallest amount which will cause adequate contraction of the muscles.

In the article upon The Treatment of Epithelioma by Radium, Dr. Boggs makes the statement that its therapeutic value cannot be thoroughly understood if it has not been studied with a sufficiently complete and varied range of filtration; he further adds that when properly applied it is the

most efficient form of radiation that we have for a depth of from two to three centimeters, but large areas cannot be treated with it, and when it is necessary to do adjacent lymphatic glands it should be supplemented by the Roentgen rays.

ENDOCRINOLOGY. The Bulletin of the Association for the Study of the Internal Secretions. Published quarterly by the Association for the Study of the Internal Secretions, Glendale, Calif.

January (1917) saw the appearance of Vol. I, number 1, of "Endocrinology," a quarterly journal to be devoted exclusively to the study of internal secretions. Whenever the initial number of a new medical journal is offered for the consideration of a medical world, already burdened with certain types of medical publications, both the new journal and the particular portion of medical science that it proposes to cover are scrutinized for an answer to the question, "Is there an actual need for such a publication?" In the present instance it may be pointed out that notwithstanding the hundreds of papers on internal secretion published yearly in divers journals, no journal is available that affords ready access to groupings of current literature on internal secretions. Endocrinopathology and glandular therapy are not exclusively pertinent to any specialty in medicine, but are pertinent to all. To-day the neurologist, the psychologist, the surgeon, the aurist, the dermatologist, the gynecologist, all find the influence of the internal secretory system exerted in the field of their particular activities. Obviously it is advantageous that reports of work relative to the problems of internal secretion in any given specialty should find outlet in the journals given over to that specialty. No one journal may hope to dominate this large and complex problem, and manifestly such is not the desire of "Endocrinology." The editors recognize that their opportunity for greatest service will be found in the function of an unbiased painstaking clearing house. The current literature of internal secretions is in itself formidable and the

total literature is gigantic. Running through both, speculation is rife, and more often than not opinion is mistaken for evidence. If this new journal proves able to cope with the intricacies of the literature alone and affords comprehensive, concise epitomies of diverse investigations in internal secretion, it will be accepted as really needed and of actual service to the medical profession.

M.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. Volume VII. Third Edition. William Wood & Company, New York, 1917.

Within the last three decades almost every medical man has become familiar with the Reference Handbook of the Medical Sciences, originally edited by Dr. Buck, but in its latest edition edited by Dr. Stedman. It will be recalled that this handbook is really an encyclopedia of the medical sciences embracing the entire range of scientific and practical medicine and allied science, the articles being contributed by various authors who are qualified to express authoritative opinions. The present volume contains nine hundred and ninety-eight double-column pages, and this publication leaves only one more volume to complete the eight of the series. The previous editions we have already mentioned. This one well maintains the quality and value of the book since its earliest publication.

Amongst other articles of interest is a competent and exhaustive one dealing with the subject of Radioactivity and covering nearly thirteen pages in condensed type. Those who desire further information will find that a bibliography is appended to each important article.

As we said of an earlier volume, this book is not only a credit to its editor and its publishers, but a credit to American medicine, not only because it represents what American medicine can do in the way of medical literature, but also because its revision is a creditable tribute to the appreciation which American medical men have for a standard and yet necessarily costly work. This volume, with its fellows, cannot be too highly recommended, for he

who has them may surely feel that he possesses a complete medical library even if he has little else in the way of medical books.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by L. F. Appleman, M.D. Volume I, 1917. Lea & Febiger, Philadelphia, 1917. Price \$6.00.

The contents of Volume One of Progressive Medicine for 1917 consists in an article of seventy-six pages by Dr. Charles H. Frazier, of the University of Pennsylvania, upon Surgery of the Head and Neck; one by Dr. George P. Müller, of the Philadelphia Polyclinic, upon Surgery of the Thorax, Excluding Diseases of the Breast, covering thirty pages; another by Dr. John Ruhräh, Professor of Diseases of Children in the College of Physicians and Surgeons of Baltimore, upon Infectious Diseases, Including Acute Rheumatism, Croupous Pneumonia and Influenza, consisting of ninety-three pages; one upon Diseases of Children, by Dr. Floyd M. Crandall, Consulting Physician to the Infants' Hospital of New York, containing thirty-seven pages; and lastly, one upon Rhinology, Laryngology and Otology, by Dr. George M. Coates, Professor of Diseases of the Ear in the Philadelphia Polyclinic, amounting to sixty-one pages.

These articles are written in a narrative form, the authors selecting the best which has been published in the last twelve months in their respective departments, with criticisms and additions made by the writer of the article. The present volume maintains the standard of its predecessors.

A MANUAL OF THERAPEUTIC EXERCISE AND MASSAGE. Designed for the Use of Physicians, Students, and Masseurs. By C. Hermann Buchholz, M.D. Illustrated. Lea & Febiger, Philadelphia, 1917.

This is a first-rate summarization and practical guide to the subjects of which it treats, and provides the information which those named on its title-page need for the proper carrying out of these remedial measures. Altogether there are eighty-nine illustrations showing the application of

various forms of massage and exercise and the tissues which are benefited thereby.

The first part of the book deals with *The Physiology of Massage, The Use of Apparatus, and The Various Movements*. The last half of the book, or to speak more correctly, the last two-thirds of the book, deals with pathological conditions and the measures which are used to correct them.

We think it may be said that, taking it all in all, this is the best summarization of the subject for the active practitioner that can be found.

NEWER METHODS OF BLOOD AND URINE CHEMISTRY.
By R. B. H. Gradwohl, M.D., and A. J. Blaivas.
Illustrated. C. V. Mosby Company, St. Louis,
1917. Price \$2.50.

The authors of this small clinical laboratory manual, of less than two hundred and fifty pages, have brought together their material in response to a demand from their professional friends who have become keenly interested in laboratory investigation. They do not claim originality for the text, but only that they have collected the major part of the information from widely

scattered sources, and, to use their term, "boiled it down into a readily digestible form." The advances in the chemistry of the blood, as they well point out, are proceeding so rapidly that it is difficult to keep the text up to date. Rather wisely, we think, the authors have not attempted to give a great many tests for the same purpose, but have given one method for each test, the one which they think the most advantageous, because the printing of a number of reactions, or tests, having the same end in view confuses the ordinary physician as to the one which is best to employ. At the end of each chapter a very considerable bibliography of recent literature is given. Thus, in the chapter on *Sugar in the Blood*, not less than sixty-five references to very recent literature are appended, covering American, English, German, and Japanese publications.

As a handy manual for the doctor who has his own clinical laboratory, and nearly every progressive doctor has such a laboratory to-day, the book can be cordially commended.

CORRESPONDENCE.

THE MORPHINE HABIT.

To the Editors of the *THERAPEUTIC GAZETTE*.

SIRS: I read with great interest the correspondence under the caption "The Treatment of the Morphine Habit," by Dr. W. B. Reed, published in the February issue.

I do not agree with Dr. Reed that a morphine habitué cannot be cured even in five weeks. Such articles have the effect of discouraging the general practitioner in the hope of a radical cure of drug addiction, and as a matter of fact the claims by your correspondent are, according to my experience, unfounded.

To begin with it appears very plainly from Dr. Reed's own statements that he is treating morphinists the same as he does any other chronic case which is not immediately threatening to life—at his office and at great intervals.

I am sure that the office or home treatment of chronic narcotism is doomed to failure and disappointment. In this the best-known authorities are agreed, for all concede that this class of cases are best taken care of in an institution.

I have been in general practice, and for some years past have been resident physician in absolute charge of a large number of drug addicts in an institution exclusively devoted to the treatment of alcoholic and drug addictions. My experience, which extends over several hundred cases, has convinced me that under a rational regimen, hygienic, dietetic, and therapeutic, even aggravated cases of morphinism or similar conditions can be restored to a normal condition in from ten to twenty days, provided the primary underlying factor has ceased to continue or is removed. A patient who

has become addicted to morphine because of an unrecognized cerebral syphilis will not be cured permanently because the phenomena forcing the patient to seek relief in opiates have not been removed. But assuming that this condition has been recognized and treated and removed, the patient has no cause to resume the use of narcotics and will not resume it, if his system has been freed from the noxæ, which we have come to look upon as producers of a vicious circle.

What has been said of cerebral lues applies, of course, to all painful diseases, be they surgical or internal (medical) in character.

The trouble with most general practitioners or non-specialists is that they do not fully appreciate the true pathology of narcotism. They hunt for symptoms rather than a logical chain of causes. Indeed, in chronic narcotism we have no poisoning in the common acceptance of the term, but a low-grade chronic intoxication, which so alters the nervous system as to bring about a continuous state of irritation. Once the cause is removed, and that can be in a scientifically conducted institution, where full control of the patient is afforded, in a comparatively short space of time, the craving for the drug is abolished. The claim that every drug addict is "a neurotic, neurasthenic, moral degenerate, or something of that class" shows a lack of appreciation of the true meaning of these words.

If one take the esthetic and ethical physicians, authors, scientists, editors, teachers, both male and female, who have become addicted to the use of opiates originally taken for the purpose of getting relief from the agonies of some painful disease, if one has seen these brilliant minds, once freed from the noxious influence of the drug and the primary disease, resume their high and useful vocations, then one questions the wisdom of labeling these pure, high-minded persons "moral degenerates."

Yours very truly,

JAMES H. APPLEMAN, M.D.

CHICAGO, ILLINOIS.

NOTES AND QUERIES.

PRACTICAL MEDICINE AND ORIGINAL RESEARCH.

The *Journal-Lancet* for March 15, 1917, contains an address by J. G. Cross, delivered as President of the Hennepin County, Minnesota, Medical Society. In it amongst other good things he says research work is a fetish at present, and every medical faculty considers it a reproach if a report of the result of research work is not forthcoming from its members at regular intervals. The words of Councilman in this respect are worth meditating upon. He draws a sharp distinction between medical teaching, research, and practice. As he aptly remarks, the investigative ability necessary to do research work is often quite independent of its surroundings. It may flourish in out-of-the-way places, as well as under the most favorable conditions. He seems also to question whether results worthy of the effort can be attained simply by saying we shall here and now produce something original. He draws a comparison between it and the production of poetry. As he says, no one would expect by founding an institution for the production of a national school of poetry to make a better lot of poetry than had existed before. Neither have the best productions of art always been the output of art schools. It has recently been said by one of our writers that there is such a vast amount of experimental work appearing and clamoring for recognition that it is absolutely impossible for any one person to keep track of that which pertains to his own particular line of practice alone. After attending a large gathering of medical men and listening to the papers presented for discussion, one almost wishes there could be a universal solvent, an intellectual aqua regia, which would dissolve them all and leave a clear solution. However, we know that it is only through the precipitation and sifting of this vast amount of product that the golden grains of truth are obtained which mark medical progress.

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ORIGINAL COMMUNICATIONS.

WHAT NEUROLOGISTS SHOULD KNOW ABOUT ELECTROTHERAPEUTICS.¹

BY CHARLES S. POTTS, M.D.,

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The title of this paper is to some extent a misnomer, as what I have to say applies not only to neurologists but to all who treat patients suffering from the disorders herein mentioned. That these are diseases of the nervous system is true; that only neurologists treat them is of course not true. Electricity as a therapeutic agent was first principally employed in nervous diseases, and the first attempts to place it upon a scientific basis were in large part made by workers in neurology such as Duchenne, Remak, and Erb. Among the first teachers in this city was Charles K. Mills. While from this time to the present legitimate indications for its use have increased considerably, it is still associated in the minds of many practitioners only with these disorders.

That electricity is a valuable therapeutic agent in many of these when properly used there can be no doubt. That it is often not properly used is the excuse for this paper, its principal object being to call attention to harmful errors which are often committed when applying it and also to the value of certain modern methods.

Time will not permit of a detailed description of the method of making the more ordinary applications, and it is assumed that to some extent at least they are familiar to all.

In applying electricity intelligently, the

physiological effects must be borne in mind, and those of special importance in the treatment of nervous diseases are the mechanical, electrotonic, thermic, counter-irritant, and psychic. The utilization of the mechanical effects is one of the most important of its uses. By this meaning the production of muscular contractions in paralyzed or weakened muscles—in other words, as a method of obtaining passive exercise. Various forms of current may be used for this purpose, those most commonly employed, owing probably to the facts that they were the first forms of current used systematically in medicine and that apparatus for producing them is more easily available, being the faradic or induced and the galvanic or constant. The sinusoidal current in many cases has advantages over both of them. To obtain muscular contractions there must be a sudden increase and decrease in the current strength—in other words, a constant current without interruption will not cause muscular contraction. The advantages of the sinusoidal current, by which is meant an alternating current, in which the increase and decrease in the current strength are made more or less gradually, are that it is not painful. This is owing to the gradual change in current density. In the faradic current this is very sudden. Second, it does not cause electrolytic or irritating effects as does the galvanic current. Third, it causes marked contraction of the involuntary muscle fibers, as for instance those of the intes-

¹Read before the Philadelphia County Medical Society, Feb. 14, 1917, as part of a symposium on ElectrotHERAPEUTICS.

tines. Mistakes frequently made when using the current for the purpose above mentioned are:

1. *Using it when the cause of the paralysis is an acute inflammation.* This may cause serious harm, and it may be stated as an electrotherapeutic axiom to never cause muscular contractions until acute inflammation has subsided. Therefore, in the acute stages of myelitis, neuritis, or immediately after an apoplectic attack the current should not be used for this purpose.

2. There seems to be a tendency to use too strong currents and to cause too many contractions. This is especially dangerous when there is disease of the peripheral motor neuron—i.e., either the cells composing the cranial motor nerve nuclei, or those in the anterior horns of the spinal cord and the peripheral nerves coming from them. In such cases there is more or less degeneration of the muscle fibers, and overstimulation will cause exhaustion and destruction of the remaining vitality and hence do harm. It should, therefore, be the rule in such cases to use a current just strong enough to cause contraction and to cause only a few at each sitting, and to allow a brief period of rest after each one. When using the sinusoidal current this is done automatically. It is well also to only give the treatment every other day. If contraction can only be obtained by the use of very strong currents, as may sometimes be the case, it may be well to postpone such treatment until some return in power has been obtained by other methods. This rule applies with special force to anterior poliomyelitis, where overtreatment may cause great harm. It is also true, however, that in these cases treatment should be continued for months even if no improvement is manifest. If treatment be persisted in good results are usually eventually obtained.

3. Not using the proper current. In discussing which current to use in his lectures on therapeutics, Dr. H. C. Wood employed the dictum, "Use the current which gives the best contraction with the least pain." In a large measure this rule still holds good. In paralysis due to disease of the peripheral

neuron, the muscles frequently will not respond to the faradic current. As the principal value of the treatment is the exercising of the muscles by causing contractions, it will readily be seen that to employ the faradic current in such cases is worse than useless. In these either the galvanic or sinusoidal currents should be used.

4. No attention is paid to the pole used. In the case of faradic or sinusoidal currents this is not so important, as they are alternating in character. It is of importance when the galvanic is used. The poles then manifest the so-called electrotonic effects, by which is meant that the positive pole causes decreased irritability or sedative effects in the nerves in its vicinity (anelectrotonus), and the negative pole increased irritability or excitation (catelectrotonus). Therefore, as a general rule it may be stated that when it is desired to improve the action of weakened muscles and nerves, the negative pole should be placed over them, or in other words be the active pole.

5. Frequently the wrong muscles are treated. This may be the case when the diseased muscle or muscles are not picked out by proper examination and when attention is not paid to their motor points in giving the treatment. It most frequently happens in treating hemiplegia resulting from apoplexy. In such cases contractures, due to overpowering of the extensors by the stronger flexors, frequently result. In such cases the rational procedure would seem to be an endeavor to improve the condition of the extensors, and the writer some years ago noticed that by confining electrical treatment to these muscles, contractures were frequently benefited that otherwise would not have been. Frantz, Sheetz, and Wilson (*Jour. Amer. Med. Assoc.*, Dec. 18, 1915) have recently called attention to the importance of only treating the extensors in such cases.

Both the mechanical and electrotonic effects may be utilized sometimes with advantage for the treatment of pain. This if due to myositis or the so-called muscular rheumatism, sometimes mistaken for neuritis, may be relieved by the application over

the painful parts of either a very rapidly interrupted faradic or sinusoidal current. The electrotonic effect of the galvanic current may also be so utilized by applying the positive pole or anode over the affected parts. This, as has been previously stated, is sedative in its influence. When so used the current of course must not be interrupted, should be increased and decreased in strength very gradually, and the other electrode must be at some distance away. The positive pole of the galvanic current similarly applied to the skin over peripheral nerves may relieve neuralgic pains. This is especially true of so-called neuralgia of the trigeminal nerve that may be due to infections, intranasal congestions, etc. I do not mean true *tic-douloureux*. In these cases the electrode must be placed successively over the so-called tender points, viz., as the supraorbital, infraorbital, and mental foramina. I have seen the pain of an acute neuritis relieved either by this method or by passing the current along the course of the nerve for ten minutes or more. In such cases, as has been previously stated, great care must be used not to cause muscular contractions.

It is well known to any one who has used electricity that the passage of a current through a conductor will generate more or less heat. Until the perfection of apparatus for the employment of the high-frequency current for therapeutic use, this property could not be utilized, for the reason that painful muscular contractions would be produced, and in the case of the galvanic current its electrolytic action would cause destruction of tissue.

By a high-frequency current we mean in general terms a current produced by the oscillating discharge from a condenser, as a Leyden jar, through a circuit of low resistance, as a metal coil. This current is alternated with great frequency. Thus, while the oscillation of the ordinary faradic current may be a few hundred a second, those of the high-frequency current may be counted in the millions. High-frequency currents also differ somewhat in characteristics, there being the D'Arsonval, which is one of the low potential; the Tesla, which

is of high potential; and the Oudin or resonator current, which is also of high potential, but is unipolar. Either the D'Arsonval or Tesla current may be used for the generating of heat in the tissues, the former being probably the preferable one. Heat so produced will involve all the tissues between the two electrodes, therefore can be made to penetrate much deeper than can be done by other means of applying external heat. The heat will also remain longer after the application ceases. A local hyperemia is produced under the electrodes and the sweat glands stimulated. This property has been termed "diathermy or electric thermo-penetration." It will readily be seen that such properties should be of great value in the treatment of inflammation, and among nervous diseases this is especially manifested in the treatment of subacute or chronic neuritis. Electrodes of pliable block tin are best, one of which should be applied over the affected nerve and the other on the opposite side, where they can be held with a bandage or adhesive strips. They must be far enough apart to prevent sparking, and for the same reason the edges must be either rounded or bound with adhesive strips and the electrode placed in close contact with the skin. These electrodes may differ in size according to the locality in which they are used. For instance, over the brachial plexus they should be about 2 by 4 inches. The amperage or current strength should also depend on the size of the electrodes, in direct ratio. It should vary from $\frac{1}{2}$ to $1\frac{1}{2}$ amperes, and the application continue for ten minutes or longer. I have also gotten good results by placing the electrodes one below the other along the nerve trunk. In the treatment of sciatica especially, too much cannot be said for this method. The vacuum electrode also causes heating of the tissues and an intense local hyperemia, and may be used in similar conditions. For its use the resonator current can be employed. It will be found useful in that stubborn condition known as brachial or radicular neuritis, in which there is great pain in the course of the brachial plexus and very slight motor disturbance. It may also be

of some value in the treatment of the paralysis due to anterior poliomyelitis, for the purpose of improving the circulation of and heating the affected limbs, which as is well known are usually exceedingly cold and cyanotic.

Myositis, as, for instance, lumbago, is speedily relieved by the use of these methods. The static wave current has been highly recommended for the treatment of chronic neuritis, but I have had no experience with it.

Electricity has been recommended for all organic diseases of the brain and cord. From a knowledge of the character of the lesions present in these conditions, it does not seem probable that it can have any curative effect. It may, however, relieve some of the symptoms. Thus a rapidly interrupted faradic current applied to the limbs with a dry brush electrode sometimes relieves tabetic pains; other forms of application have also been advised for this purpose. Paralyzed sphincters also in some cases may be strengthened.

Electricity has also been much advised for the treatment of the various neuroses. Here its psychic effect undoubtedly may have considerable influence. In addition, in

certain cases, it may do more than this. Thus in neurasthenic conditions—and it is important to remember that they may be due to a number of causes, many of them organic—certain symptoms may be relieved. High-frequency currents applied with a vacuum electrode to the spine may relieve the backache.

The static breeze will often relieve the headache. The sinusoidal current may be of service in correcting constipation and improving the tone of muscular coats of the intestines. As part of the so-called "rest cure," the use and value of the faradic current as a means of passively exercising the muscles is well known. As the employment of high-frequency currents by autocondensation improves metabolism, another indication present in many of these cases is apparent. It should not be so employed if the blood-pressure is low.

I am well aware that the use of electricity in its various forms has been advised for many other disorders of the nervous system that I have not mentioned, and also that different procedures have been advised for the treatment of those that I have named. What I have stated I have found valuable in my own experience.

SPECIFIC TREATMENT IN PULMONARY TUBERCULOSIS.¹

BY GILBERT T. BROWN, M.D., DAYTON, OHIO.

In presenting my clinical experiences and results in the treatment of pulmonary and other forms of tuberculosis during the last twelve years, it is with the belief that the methods of treatment which were employed will be helpful to those who still depend upon the usual hygienic and dietetic methods alone, as I had done myself during the preceding years of my practice.

Like others I found that the majority of tuberculous patients are unwilling and many of them entirely unable to seek their recoveries away from home under the care of specialists or in private sanatoria, and

also that the commonly practiced methods are to say the least but rarely successful. Indeed, I do not remember a single case of the disease in which I accomplished a complete clinical recovery prior to my inclusion of specific remedies in their treatment.

In 1904 my attention was attracted to the watery extract of tubercle bacilli, as used by Dr. Karl von Ruck in his sanatorium for tuberculosis in Asheville, N. C. I have used this preparation upon most of the patients under consideration. More recently I have also used his vaccine against tuberculosis, and the results obtained and to be related will make apparent the benefits which my patients derived.

I am in a position to report upon the re-

¹Read before the Montgomery County, Ohio, Medical Society, February 2, 1917.

sults in fifty-two cases which were treated by me since 1904, and in so far as the patients are still living they have been kept under observation to the present time.

Of these cases twenty-two, or 42.3 per cent, were in a comparatively early stage; thirteen, or 25 per cent, in a moderately advanced stage; and seventeen, or 32.5 per cent, were in the far advanced stage of the disease, at the time when the specific treatment was first employed.

Not desiring to detain you with the details of the case histories of these patients, and yet wishing to give some data of their condition when they came under my care and on their discharge, I give the essentials, especially of the most important features which were observed.

The *nutrition* in tuberculosis often suffers at a quite early period, and all excepting two of my patients had lost weight which varied from five to fifty pounds, averaging about twenty-one pounds.

After discontinuing treatment forty-five patients showed gains in weight varying from five to forty-five pounds and averaging about eighteen pounds; five patients had either shown no gain or had continued to lose.

It seems to me that the improvement noted in nutrition is in itself indicative that the patients profited by the dietetic regimen which was followed; the specific treatment favored a better metabolism and improved the patients' appetite, and assimilation became so strikingly apparent in certain instances that there could be no doubt of the relation, because their appetite improved promptly when for weeks and months there had been no desire for food, and the steady decline in weight ceased and was followed by a prompt and steady increase. Four patients with apparently severe gastric complications, and whose stomachs rejected almost everything and could digest but little, were able to digest full, generous meals at the end of the first month without the aid of other therapeutic measures.

Fever was absent in only five or 9.6 per cent of my patients. In twenty-eight it was moderate in degree, not exceeding a maximum of 101.5°. In nineteen it ranged

higher, especially in the far-advanced cases; maxima of 102° were frequently noted; and in several instances the afternoon temperature was 103°, and in one case 104°, Fahrenheit.

On discontinuing the treatment the temperature was normal in thirty-six, or 69.2 per cent; it did not exceed 100° F. in eight, or 15 per cent. In the other cases, in which the type of the pulmonary disease was as a rule pneumonic and mixed infection appeared to dominate the clinical course, the fever continued unabated, or was but slightly less than on admission.

Cough and expectoration was as yet absent in seven, or 11.7 per cent, of my early-stage cases. These symptoms were slight in twenty-three, or 45 per cent; moderate in degree in fourteen, or 24.9 per cent; and severe in eight, or 15.6 per cent. Tubercle bacilli were found in the sputum in twenty-nine, or 58.8 per cent.

On discontinuance of specific treatment there was no cough or expectoration in twenty-eight, or 53.8 per cent; only slight in fourteen, or 27.4 per cent; moderate in six, or 11.7 per cent; and severe in four, or 7.8 per cent. Tubercle bacilli were absent in thirty-seven, or 71.1 per cent, and were found in fifteen, or 28.8 per cent.

Mixed infections. Other pathogenic microorganisms were found in twenty-five, and in twelve, or nearly half, of them their relation to the clinical course appeared probable in that the type of the fever was hectic, reaching maxima of 102° and over. The organism in relation was as a rule a pneumococcus; in a few cases the influenza bacillus was found. In several of these patients the associated infection yielded to stock vaccines, of which I availed myself in more recent years, and which would probably have prevented several failures in my earlier cases.

Hemoptysis. Pulmonary hemorrhages had occurred prior to treatment in several of my patients; none occurred during the administration of watery extract or of the vaccine, although marked focal reactions occurred repeatedly in the affected lungs in almost all cases. In one patient, treated in 1913, slight hemoptysis, amounting to less

than one ounce, occurred after the treatment was discontinued, which caused its resumption, and the patient has since continued in good health.

Night sweats. Before being treated, night sweats had occurred regularly in six and occasionally in eleven of the patients. This symptom was still present on discharge, in four of whom the treatment had also failed to cause other improvement.

Tuberculous complications. Tuberculosis of the larynx of a marked degree was recorded in eight cases, four of which showed ulceration and belonged to the far-advanced class of progressive phthisis. One of them treated in 1905 recovered, and is still in good health; of four cases in which the laryngeal affection was well marked but had not progressed to a stage of ulceration, two treated in 1907 recovered and are still in good health. In numerous other instances, slighter symptoms, such as hoarseness, were present or focal reactions occurred in the larynx, but owing to my limited experience in laryngology I could not make a positive diagnosis. I therefore leave them out of consideration, but if those cases represented tuberculosis of the larynx in an early stage, recovery followed in all of them.

Tuberculosis of abdominal organs, including intestines, genitalia, and peritoneum, was diagnosed in seven cases, six females and one male. An interesting feature in all of them was the occurrence of focal reactions which manifested themselves by increase of the local symptoms. In two of these patients treated in 1906 and 1907, and in whom tuberculosis of the intestine and pelvic organs was a complication of the pulmonary disease, complete recovery followed, and both are well at this time. Another case treated two years ago, with parametritis on the left side and marked focal reaction in the lower part of abdomen and the rectum, was greatly improved; her pulmonary symptoms having disappeared she discontinued treatment. She has continued in a fair state of health. A fifth case treated in 1914 had previously been operated upon for rectal stricture; she had a rectovaginal fistula. A Wassermann

reaction was positive, and positive focal reactions were likewise observed on the administration of the von Ruck vaccine. Another operation became necessary on account of the rectal stricture, and succinimide of mercury was thereafter administered for nearly a year. This patient recovered from her pulmonary tuberculosis, and recent reports indicate improvement of the rectal affection. The other two patients succumbed to their disease.

Tuberculosis of bones and joints was present in three of the cases. One case of tuberculosis of the knee-joint treated in 1907 in a far-advanced stage of phthisis recovered from both his joint and pulmonary disease and has continued in good health since.

Tuberculosis of the vertebra was found in two cases; in one the first dorsal vertebra was involved, but the pulmonary disease was comparatively slight; this patient also had pelvic tuberculosis and probably also tubercle in the intestine; marked focal reactions followed the administration of the vaccine in the vertebral lesion and were attended with sharp attacks of diarrhea. This patient has also apparently recovered. The other case of spondylitis of first and second dorsal vertebræ had no active lesions in the lungs, and the focal reactions, which were well marked, were limited to the vertebræ. The reactions grew less and eventually ceased. This patient is still under observation, having markedly improved. He is wearing a brace, and the spinal curvature is becoming markedly less.

Non-tuberculous complications were observed in a considerable number of the patients under consideration, especially in the moderately advanced and far-advanced stage. Several such complications were at times present in the same case, and the pulmonary disease was further complicated by extra-pulmonary tuberculous affection and by mixed infections to which I have already referred. In other cases anemia, albuminuria—with or without casts—gastric catarrh, and gastropnoia, cholecystitis, malaria, chronic nephritis, and syphilis were recorded on their admission. Altogether there were fifty instances of non-

tuberculous affections coexisting, which were treated with success in twenty-three instances; twelve other cases improved, and in the remainder no material improvement could be observed.

Considering this clinical material as a whole it is evident that a considerable number offered formidable obstacles, both on account of the advanced stage of the pulmonary disease and of the complications that were present.

A tabulation of the clinical results observed shows that recovery occurred in all of the twenty-two patients who were in a comparatively early stage. Seven of the thirteen moderately advanced cases of phthisis recovered; three cases were improved sufficiently that the disease could be considered as arrested; three others were improved. In the seventeen patients of the last stage of phthisis only two recoveries occurred. The disease was arrested in three and improvement was noted in three others. No result at all was obtained in nine cases. This totals for all stages thirty-one recoveries, or 59.6 per cent; six arrestments, or 11.5 per cent; with lesser degrees of improvement in six others, including the coexisting complications.

Of great interest appears to me the permanency of the clinical results. All except one of the patients here considered have been traced, and most of them have been under more or less continued observation. The results as determined at the present time are as follows:

Early stage, 22 cases: All are living; eighteen are in good and three in a fair state of health, without recurrence of their tuberculosis; one could not be traced, but it was a mild case and the recovery appeared complete; it is not probable that a relapse occurred.

Six patients who were treated in this stage were dismissed ten to twelve years ago. Four patients were dismissed between six and ten years ago.

Twelve patients were dismissed since 1910.

Moderately advanced, 13 cases: All are living; ten are in good and three patients

in a fair state of health, without relapse since their dismissal.

Nine patients were dismissed ten to twelve years ago.

Four patients were dismissed since 1910.

Far-advanced stage, 17 cases: Six are living; four are in good health, and two patients have continued in fair health without relapse since their discharge. In seven patients the disease progressed; three patients, after having improved, experienced a relapse; all have died since their treatment; one died of acute nephritis seven years after her complete recovery, during which she enjoyed good health and had gone through two pregnancies, and both children so far as I am informed are living and in good health. Of the six patients now living four were treated ten to twelve years ago, one eight years ago, and the other was dismissed during the present year.

CONCLUSION.

With only ten deaths from tuberculosis, all of which occurred in instances of far-advanced consumption, and the remainder living in good or fair health without relapse after their apparent recoveries and after periods up to twelve years, I feel justified in concluding that great aid from the specific remedies applied has accrued to the forty-two of fifty-two patients, forty-one of whom are now living in good and fair states of health. Without specific treatment added to the ordinary hygienic and dietetic methods my results in the treatment of tuberculosis prior to its adoption were practically negative.

My experiences also show that specific remedies can be applied by general practitioners with safety and with approximately equal success as is obtained by specialists, and this is undoubtedly true of the use of Dr. von Ruck's preparations, which are the only ones with which I am practically familiar.

The watery extract which I employed prior to the introduction of his vaccine has produced equally good results, and some of my most gratifying successes in the advanced cases of phthisis were obtained with

it. The vaccine appears, however, to me to be a more powerful immunizing agent, and in early-stage cases especially the improvement observed by me appeared more rapid and an apparent recovery was effected in considerably shorter time.

The methods of preparing the watery extract of tubercle bacilli and that for the preparation of the vaccine against tuberculosis were given in their respective announcements.

The formula for the watery extract of tubercle bacilli is given in a paper read before the American Climatological Association, which appeared in its Transactions for 1897, and also in the THERAPEUTIC GAZETTE of the same year, page 388.

The preparation of the vaccine is given in a report from the von Ruck Research Laboratory, June 1, 1912, and in vol. 82, 1912, p. 369, of the *Medical Record*. Sufficient details are supplied in either case to enable any well-equipped laboratory to manufacture an identical preparation.

The watery extract represents a solution of extractives from tubercle bacilli in water after the previous extraction of their lipoids with ether and alcohol.

The vaccine is represented by all body extractives and in definite proportion of the several proteids, albumin, and lipoids. It is so balanced that the most important immunizing body substances of the bacilli are present in larger amounts, whereas the lipoids are reduced sufficiently to remove the danger of local necrosis at the site of subcutaneous injection.

The advantages of the vaccine are considered to depend upon the presence of all the immunizing body substances of tubercle bacilli in solution without chemical or physical injury in the course of their extraction, and in such proportions that much larger doses can be administered than of a tubercle bacillus emulsion. Being a solution of the bacillary body substances, its action is certain and uniform and occurs with a promptness sufficient to insure a complete bacteriolytic immunity within a few days after the administration of a single full dose for the respective age of the individual, features which the authors

consider especially essential for prophylactic vaccination in order that the latter shall be practical, reliable, and simple, the same as is vaccination against smallpox or typhoid fever.

In order to prevent self-treatment and the use of the preparation by incompetent persons, they are not supplied to the trade and must be ordered directly from the laboratory by physicians.

The technique of administering the watery extract of tubercle bacilli and the vaccine for the treatment of tuberculosis is the same. Physicians receive with their first order general directions in regard to dosage and the selection of the cases; and I have found the Drs. von Ruck extremely courteous and ready to consider and answer by letter any questions that may arise, with the view of aiding those less experienced in successfully treating their tuberculous patients at home.

Inasmuch as the degree of spontaneously acquired immunity in tuberculous patients varies, the degree of sensitiveness and liability to reaction does so likewise. To prevent severe reactions the beginning dose should be minimal, and is from 0.05 to 0.1 Cc. of the full strength of the remedy. On request a 10-per-cent solution of both preparations is supplied by the laboratory, and directions are given for their preparation, which is simple and requires the use of boiled water containing 0.5 per cent carbolic acid in proportion to one part of the remedy and nine parts of the water.

Injections are made subcutaneously, and the locality must be changed frequently in order to prevent the neutralization of the dose by the occurrence of a local immunity greater than that of the blood and of distant tissues.

The increase of doses depends upon the observed general and focal reactions; so long as these occur no increase is permissible, and if severe the dose should be reduced. The interval between doses is five days providing no reactions follow or when observed if the symptoms and signs disappear within forty-eight hours after administration. The subsequent increase of doses has for its object the continuance

of periodical specific stimulation of tuberculous lesions and the increase of the general immunity. For the size of subsequent doses, individualization is necessary. As a rule, and especially in the early part of treatment, an increase of 0.1 Cc. is sufficient. There is no maximal dose, but it is not often necessary to exceed 1 Cc., especially if the site of the injection is varied. Intravenous administration is recommended when reactions to 1 Cc. fail; the intravenous dose should not exceed one-fourth of the dose which failed to cause reaction.

For prophylactic administration in instances of clinically non-tuberculous persons, and such who have been exposed to infection who are free from fever, and in good nutrition, a single maximal dose may be given, which in size varies according to age and weight. For children up to one year of age the dose is 0.1 Cc.; for adults weighing in the neighborhood of 150 pounds it is 1 Cc. In cases which present evidence of tuberculosis the procedure to be followed is the same as outlined above for treatment.

PRACTICAL USE OF DEAD CULTURES OR VACCINES.

BY LEO BERND, M.D., PHILADELPHIA.

So much theory has been written about the use of dead cultures or vaccines that the practical side has been overlooked.

While most of the writer's work has been urethritic, he has had some interesting results in other cases.

Several years ago, in a case of nasopharyngeal catarrh which persisted in spite of the specialists, a mixture of the different organisms found, in about four injections, practically cured the patient. Since then a number of the author's friends have been injected as a prophylactic measure, and none of them has had gripe or colds to any extent. The mixture used contained pneumococci, staphylococci, streptococci, catarrhalis, and all others found in the sputum.

One case of pneumonia, on a large dose of pneumo-, strepto-, and staphylococcic injection, within three days was practically well. On Saturday the temperature was 105° F., complete consolidation on the right side, with pneumococci in the sputum. The patient's temperature came down by lysis, and the patient was home in one week with no bad results. Another pneumonia case acted the same way.

In furunculosis and acne the results have been wonderful.

In acne the results are slow. There is no remarkable change at once, but after a month or two the patient suddenly realizes that there are no more lesions appearing.

The author prefers cultures from the individual. Stock (acne) preparations have given some results, but the autogenous are the better.

The staphylococcic cultures seem to work just as well pure as when mixed with the so-called acne bacillus. In one acne case mixed staphylococcic and diphtheroid organisms were used.

In rheumatic cases the mixture of pneumococci and streptococci has given good results.

In the surgical dispensary of the out-department of the Woman's Medical College all pus cases are given staphylococcic mixtures. It is remarkable to see how quickly they sometimes recover without operation, especially when the glands of the neck and axilla are affected.

An orchitis, with no visible urethral discharge, responded to gonococcic cultures, and in two injections was nearly well.

In several burn cases, when there seemed to be a tendency to general infection, streptococcic vaccine injected stopped the process immediately. This idea was evolved from the fact that quite a number of children developed scarlet fever after severe burns.

The uniformly good results have only followed large doses of the bacteria.

In gonorrhea the initial dose is never less than 20 billions; in staphylococcic injec-

tions at least 10 billion, and in acne the same.

The nasopharyngeal cases have required at least four and sometimes six injections, at intervals of four to five days, increasing the doses.

Drain cases of appendicitis, with fistula, heal more rapidly when given dead cultures containing the organisms found in the pus.

Following the injection, the patient in about three to five hours has a feeling of

malaise, probably a chill, and usually within twenty-four hours is all right. There is a feeling of fullness and sometimes pain over the kidneys, as though the capsules were tight, due to swelling. The urine is cloudy, sometimes, with albumin. All this clears up in twenty-four to forty-eight hours. This is more noticeable in cases in which stock vaccine has been used—probably due to the trikresol used as a preservative. It seldom occurs in the unpreserved culture.

SOME SURGICAL PROBLEMS OF TO-DAY.²

BY J. E. SWEET, A.M., M.D., F.A.C.S.,

Professor of Experimental Surgery in the Medical Department of the University of Pennsylvania.

An invitation to come from Philadelphia to Boston carries with it a great honor and a great responsibility. It is not difficult to appreciate the honor; it is difficult to live up to that honor—it is difficult to merit the responsibility.

I have chosen as the subject of my talk "Some Surgical Problems of To-day" because it seemed that if I were to venture to carry coals to Newcastle, these coals must have come from some different sort of mine than the one from which you in Boston have already mined such a vast tonnage. The only thing I am doing which is in any way different from what you are doing, is that I am spending my entire time in the study and teaching of surgical problems. This gives me a peculiar advantage perhaps in being so placed that I am in close touch with both the laboratory and the clinic, yet not so close that I feel that I belong to either group alone.

Therefore it seemed that anything I might find to interest you must be sought in this field, and might best consist in a simple exposition of what we are doing and are trying to do in the department of surgical research of the University of Pennsylvania.

I shall necessarily often use the personal pronoun or the editorial "we." I regret

that this must needs be so, for I would rather talk of you and of Boston and of Boston's hospitality, but I do not suppose you invited me to come and talk of what you know better than I.

The department was started when we had a surgeon as dean, Dr. Frazier. It has now won the support of our present dean, Dr. Pepper, an internist. Perhaps this alone gives you an idea of the measure of our success, that a department started by a surgeon should succeed in convincing an internist. The idea behind the starting of such a department was that there is much room for a department of surgical research as much need for research in surgery as there is for similar work in the department of medicine.

While it is true that there is no subdivision of medical problems, that the problems of surgery are the problems of medicine, that both are the problems of pathology, that both are the problems of physiology—all problems of biology—it still remains that many problems are peculiar to surgery, and that many more there are in which the skill of the surgeon is necessary to their solution.

There is another phase of the possible usefulness of such a department. The deliberate cultivation in the student's mind of that spirit of doubt, of inquiry, of search for truth which characterizes the student

¹The doses used by the writer of this paper are larger than customary, and this probably accounts for the severe symptoms following their use.—Ed.

²Read before the Norfolk District Medical Society at Boston, January 30, 1917.

of the laboratory, which marks by its absence the empiric practitioner—this attitude of mind is not seen often enough in the surgeon. Therefore a laboratory which can instil into the surgical mind this point of view, by showing the student of surgery wherein he may profit by it in his own chosen field, will fulfil its broadest mission.

The work of such a department will therefore fall under two headings: the teaching of the student of surgery, and the research work of the department—the attempt by applying any branch of knowledge to surgery to solve the problems of surgery.

The common conception of any department of surgical research as a teaching department for undergraduate students is that of a place for teaching surgical technique by actual practice on the living animal. There can be no doubt that such experience is of enormous value. The art of surgery is a mechanical art, and practice is necessary to the perfection of mechanical technique. As in watch-making the apprentice is not set to work upon the finest specimens of the watch-builder's art, but upon the alarm clocks; so in surgery it does not seem right, to the surgeon at least, that the apprentice should learn first principles upon the most perfect specimen of nature, man. Another very important feature of this phase of the work is the training in the power of observation. A student can better understand the clinical work if he has an idea from personal experience of the difficulties being encountered by the surgeon, of just what the surgeon is trying to do.

This is undoubtedly an important feature of the work, but it does not in our opinion represent the highest utilization of the facilities of such a department. Too often the need for technical skill is so emphasized in surgery that the student never sees beyond. Too often the surgeon merits the reproach of being only a carpenter. Too rarely does he combine the skill of the worker in wood with the imagination of the architect. What we need in surgery is not more men so skilled that they can operate without thinking, but more surgeons so

trained that they can think and therefore perhaps not operate at all.

The teaching work of the department consists in giving a good deal to a few students, rather than in giving less to a good many. The course is not a required course for the reason that only a small proportion of any given class should be encouraged to enter surgery. Therefore it is an elective course, further limited by the resources of the department to twelve men chosen from those of the third-year class who have elected the course. Thirty-seven elected the course this year; twelve were chosen. These twelve men start upon some standard operation, one acting as surgeon, one as assistant, one as anesthetist, each taking turns until they have mastered the rudimentary details. Then each group of three starts upon some surgical problem, working one period each week throughout the third year, and without exception they are sufficiently interested to continue the work throughout the greater part of the fourth year, giving up one evening each week for the purpose.

What are the problems upon which they are engaged? At the present moment four groups of fourth-year men and four groups of third-year men are working out specified problems. You will gain the best idea of what they are doing from a description of their problems.

One group of fourth-year men is working at the question of the relation of the adrenals to gastric ulcer. You will recall that recent publications have discussed this subject, and it is certain that definite ulcers do appear after double adrenalectomy. The explanation of these ulcers is not clear, nor is the bearing of these observations upon the problem of the etiology of gastric and duodenal ulcers in the human being. A second group is studying the methods for treating a pyloric stenosis; a third group is busy on the question of peritoneal adhesions; a fourth with some problems concerning the thoracic duct.

The character of this work you may soon judge for yourselves. The four papers representing the work done by the

four groups of the class of 1916 are soon to appear in *Surgery, Gynecology and Obstetrics*.

The third-year men are just starting, the one group on the possible reconstruction or reformation of the gall-bladder from the stump of the cystic duct. Several instances are on record of the reformation of the gall-bladder after cholecystectomy. Naturally this work will have some bearing upon cholecystectomy versus cholecystotomy. A second group is studying the relation of the lymphatic system of the gall-bladder to intraperitoneal infection. A third group is experimenting on the relation between thyroid and adrenals, and the fourth is quite busy with a problem in anaphylaxis.

Now many of you are wondering what much of this has to do with surgery. My answer is that it depends entirely upon your concept of surgery. If the surgeon is only the carpenter, the internist the architect, if surgery is only technique, not diagnosis, if the diagnosis of surgical conditions does not require that same insight into the finest workings of the human machine as does the diagnosis of medical conditions, then it has nothing to do with surgery. Our concept of surgery is that the real surgeon must know as much as any man in any branch of medicine, and having learned that he has still to learn the whole field of surgical technique.

For instance, why should a group of students be working at anaphylaxis in a surgical department? Does not this subject belong to the internist and the serologist? Perhaps it does generally, but the occurrence of gastric ulcers after adrenalectomy, the occurrence of ulcers after diphtheria intoxication, and the occurrence of ulcers after anaphylactic shock bring the simple surgical problem of the etiology of gastric and duodenal ulcer to a point where to understand the possibilities one must go into the subject of anaphylaxis. The surgical technique connected with a problem involving thyroidectomy, with preservation of the parathyroids and adrenalectomy, is quite sufficient for the pure technician. It also requires a study of the

function of the thyroid and the adrenals which will prepare the student for an understanding of the present trend in the study of the toxic goitres.

Again the question, is not the greatest surgical problem of the day how we shall make ourselves better surgeons, how we shall train better surgeons; do we want more men so skilled that they can operate without thinking, or more men so trained that they can think without operating?

The research work of such a department falls under two headings: Work done for other departments, in which other branches make use of the technical skill of the department, and in return offer their facilities for the study of purely surgical problems, and the specific research work of the department itself. This coöperation with other departments is one of the most gratifying and important developments of our work. As in any other modern plant, thorough coöperation between various organizations is necessary. So we have done many and varied operations—hypophysectomies, thyroidectomies, gastrectomies, pancreatectomies, various blood-vessel anastomoses etc.—for the physiological chemist and for the workers in research medicine. The research work of the department, the study of surgical problems, I will attempt to illustrate to you by a discussion of our results along several lines, using lantern slides wherever possible to make my meaning more clear.

Five years ago we were interested in the problem of the pituitary. Following out our ideas of coöperation, we associated ourselves with a neurologist, Dr. A. R. Allen. At that time a problem of considerable interest to us was whether the gland was essential to life or not, a question that is perhaps not yet clearly solved. The point seemed rather essential, for if the gland is necessary to existence, the surgeon should know the limit of safety in its partial extirpation. At that time we reported the results in 22 dogs, of which series five lived for months and one lived until the last two weeks, when he died of distemper pneumonia. Since that time we have operated

on many more dogs for many different reasons with a much better operative record. In none of the dogs operated upon have we ever noticed any important, symptoms referable to the operation, no peculiar gait or position, no tremors nor other clinical symptom. Recovery was prompt and without complications.

The technique of operation is as follows: An incision about two inches in length is made in a perpendicular line over the center of the zygoma, the zygoma forming, as it were, a base line with the two-inch incision extending in a perpendicular to such a base. The zygomatic arch is removed, the coronoid process of the mandible resected, and the base of the skull thus approached in a direct line. The skull is trephined and the hole somewhat enlarged downward, and after opening the dura, which is firmly attached to the base of the skull, the brain is carefully elevated by a suitable retractor. The hypophysis is then removed by a special loop forceps, the entire gland being generally removed in one piece. The wound is closed without drainage. With a strong light—in my own work I find it is necessary to use direct sunlight reflected from a heliostat to a mirror—no particular difficulty is encountered. Without this light I have been unable to accomplish anything. This approach, which has been used before, was chosen because the Paulesco-Cushing incision, with its extensive removal of the skull, seems unnecessary, since in our opinion the movability of the base of the brain is determined by the length of the arterial connection between the internal carotid and the circle of Willis rather than by the extent to which the brain may be lifted out of a large opening in the skull.

The first change which we have noted in the animal following this removal of the pituitary is an indeterminate effect upon the pancreas. In all the animals in which we have regularly made note of the pancreas, it is recorded that the organ presented a striking coloration, having the appearance of the gland seen at the height of digestion. Ordinarily at autopsy the pancreas presents the picture of a pale, even white, organ, the

lobules at the edge being rather hard to differentiate from the neighboring fat tissue. Microscopically, these changes apparently consist only in a marked congestion, and are perhaps identical with those to be found in the pancreas at the height of digestion.

We have, in collaboration with Dr. Ringer, formerly of the department of physiological chemistry, endeavored to work out more definitely this relation between the hypophysis and the pancreas. It is known that if the greater part of the pancreas be removed, leaving for example the small island of tissue which in the dog is drained by the duct corresponding to the duct of Wirsung in the human subject—that is, leaving about one-twelfth of the pancreas in its normal position and completely removing the rest—the animal can thereby be brought to a very exact threshold of sugar tolerance. Thus I recall one animal in which following such an operation thirty grammes of protein given by mouth was completely burned, while the feeding of forty grammes resulted in the appearance of glucose in the urine. Now it seemed that if from such an animal whose glucose metabolism is on the very edge of the threshold of tolerance, the hypophysis were also removed, one should be able to demonstrate the clinical fact that the human hypophysis does seem to have some influence in the control of sugar metabolism. But our studies on a sufficient series of animals gave us no result whatever. We do not therefore conclude by any means that the clinical observation is wrong.

The second finding after hypophysectomy, which has been almost constant, is the pronounced atrophy of the testicles. This atrophy involves only the spermatogenetic tissue of the organ and is complete where it occurs in a very short time. One specimen removed ten days after hypophysectomy, another after fifteen days, show this very complete loss of this one group of cells. The interstitial cells are apparently normal. The third finding is the enormous increase in adipose tissue. The animal whose picture I have shown you doubled his weight

Five years ago we reported that in three dogs autopsied and studied after several months' time the thyroid presented a change, the significance of which we could not interpret. There is an evident increase in the amount of colloid with a flattening of the cells lining the alveoli.

Now this dog, whose picture I have shown you, died within the last two weeks of an intercurrent distemper pneumonia, having lived to all appearances in perfectly normal condition, except for the enormous deposition of fat, for almost five years after the operation upon the hypophysis.



Dog at left four years after the removal of the hypophysis. Compare the fold of fat on the abdomen with the clinical pictures of the obesity of hypophysis disturbance.

The autopsy of this animal has revealed some very interesting conditions. There was no macroscopic evidence of any pituitary tissue. The entire base of the brain is being sectioned for microscopic study. The pineal seemed normal. The thyroid lobes had apparently entirely disappeared, the thyroid being represented by a thin lobule, corresponding to the human isthmus. The dog's thyroid ordinarily has no isthmus. The thymus was persistent and large, weighing 23 grammes. Heart, liver, spleen, and kidneys showed no gross changes except an abnormal amount of fat. The adrenals are grossly normal, possibly somewhat smaller than normally. The testes show pronounced atrophy. The lungs show the evidence of distemper pneumonia.

In spite of the apparent degeneration of the thyroid, I am not prepared to say that

this animal showed any symptoms of myxedema. At any rate the condition of the dog's hair was unusually good, and I have noticed in other animals what seems to be an unusually rapid growth of hair and an unusual fineness of texture of the hair.

This operation of hypophysectomy has also been used following out our ideas of coöperation for a study of the so-called Abderhalden reaction. You will probably wonder what this has to do with surgery. The reaction, as you know, depends upon the fact that the serum of certain patients, such, for example, as the serum of a pregnant woman, when incubated from a substrate made from tissue, as for example in pregnancy placenta tissue, incubation being carried out in a dialyzing bag, causes some substance to appear in the dialyzate, which reacts with the substance known as ninhydrin; this reaction has been suggested as a means of diagnosis of malignant tumors, which I think you will agree is a rather important surgical matter. My associate in the Oncologic Hospital in Philadelphia, where I am engaged in an advisory capacity, Dr. Saxon, has devised an improvement in the technique of the reaction, and we have been using these hypophysectomized animals to test out this Abderhalden reaction. Without entering here into a discussion of the Abderhalden reaction, its value in pregnancy or whether it has anything to do with the amino-acids or with tissue ferments, let me say only this, that these dogs give consistently a positive reaction to testis if they are males, a positive reaction to ovary if females, that the males do not react to ovaries nor the females to testis, and that some three years ago this dog whose picture I have shown you, which lately died, gave constantly a positive reaction to testis and to thyroid.

I do not know the meaning of these things I have found. We are all working at a building, bricklayers working under the direction of a master, each building his part brick by brick, not even knowing the purpose or design of the building as a whole. I do not feel inclined yet to attempt to form an idea of the whole build-

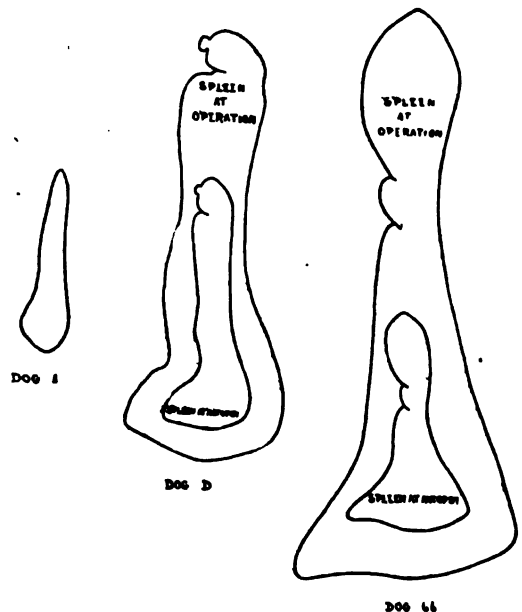
ing. He who lays down his trowel and climbs down from the scaffold to walk back and see the structure as an entity, only succeeds in stopping his own adding to the structure. Some day the Master will permit us to see, when we are laying the top courses, what it is all for.

These findings in the hypophysectomized dogs of some relation between hypophysis, pancreas, and thyroid, suggest another problem, the relation between pancreas, spleen, and thyroid. Our work on this problem came from a statement made by our professor of physiological chemistry, Dr. A. E. Taylor, that since the digestive ferments are represented at so many different places along the alimentary canal, the loss of any given series of ferments would be compensated from some other source. Therefore the digestive function of the pancreas could be dispensed with. I did not believe this statement and made a few experiments, discovering first that the physiological chemist was correct, learning anew that it does not pay to doubt. The external function of the pancreas was removed either by cutting the two ducts between two ligatures and interposing omentum to prevent their reformation, or by the entire removal of the duct-bearing area of the pancreas. Such an animal will lose weight down to a certain point, and will then hold its own in apparent good health. One such animal was allowed to live for ten months. At autopsy the most striking feature observed was the very extensive atrophy of the spleen. After this the spleen was measured at operation and again at autopsy. These pictures show the results. This central picture shows the effect upon the spleen of an acute pancreatitis, this degree of atrophy having been found three days after an operation upon the pancreas which resulted in an acute pancreatitis. This observation suggests a possible explanation for the report published by the late Dr. Musser of the recurrence of acute anemia in a number of cases of acute pancreatitis.

The second finding of note in these animals was the condition of the thyroid, which

shows gross changes consisting in an apparent increase of colloid, with the result that the gland becomes translucent and even actually transparent. Chemical studies show a great increase in the amount of iodine in such glands.

I have introduced these results here, even though they are perhaps in no sense surgical, to bring out a point in the problem of the ductless glands, which I believe will some day assume practical importance. Whatever these glands are doing, it is certain that they must obtain a mother substance for the manufacture of their specific products from some source or other. This



Outline drawings of the spleen before and after the complete removal of the external function of the pancreas.

mother substance can only be obtained from one of two possible sources. It is either a product of anabolism or catabolism, and in either event must come in the last analysis either directly or through the mediation of some other gland from the food taken into the body. Therefore, and this I feel may become a point of practical importance, it may become possible to control the function of the ductless glands by controlling the food supply of the body, just as in the experiments I had cited the spleen and thyroid are changed after the removal of the great digestive function of the body. This is not necessarily a new idea—we use

it clinically, for instance, in the treatment of toxic goitre; but I feel sure that more study along this particular line would result in information of great value. It seems to be thoroughly established, for instance, that beriberi is due to a lack of certain food elements. It is not impossible that the same

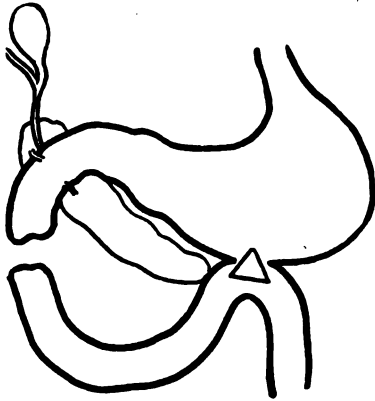


FIG. 1.

disease picture could be produced by the inability of the body to absorb or utilize these specific substances even though they were present in the food.

I would not be surprised to find that the cancer problem lies right here. Given a group of cells removed from the influence of those factors which control cell growth,

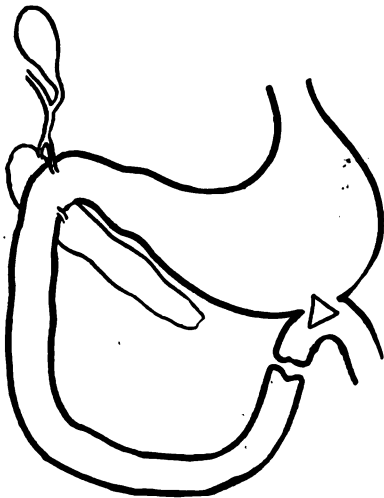


FIG. 2.

that influence which says a kidney for example shall grow so large but no larger, and given an excess of the food elements needed for the growth of cells, why should we not have a cancer? The hypertrophy

of acromegaly is essentially a tumor growth only with the cells still held in their normal relation. At any rate our work at the Oncologic Hospital has shown conclusively that experimental tumors will not grow in animals fed on a diet which fails to furnish those food factors necessary for body growth, and on the other hand there are certain substances, notably cholesterol, which greatly stimulate tumor growth in experimental animals even to the point of causing very extensive metastases with a tumor which normally does not metastasize.

These are theories, idle theories perhaps, but if you would make much progress along any line, experimental or clinical, you must suppose something and then see if your

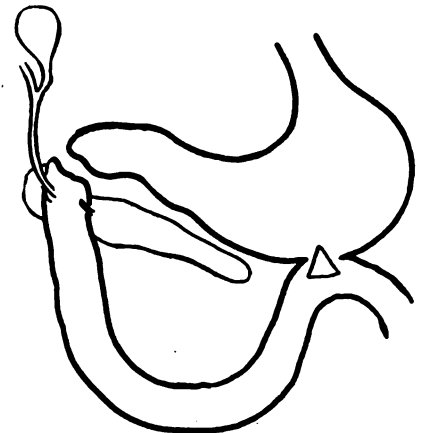


FIG. 3.

facts fit the supposition. He who refuses to suppose anything until it is proven will have to wait for some one else to prove it.

Another problem which has engaged the attention of the department again in coöperation with the department of physiological chemistry, this time with Dr. Byron Hendrix, is the problem of high intestinal obstruction.

The problem of the cause of death in either the mechanical or functional, i.e., paralytic, obstructions of the upper bowel is not a new problem of surgery. Many explanations have been offered, practically each worker offering a new theory to account for the clinical fact that such disturbances of the normal physiology of the upper bowel are marked by the clinical picture of a grave constitutional disturbance of a

manifest toxic nature. Among these theories, for example, were that the picture is due to central nervous disturbance, to peripheral nervous disturbance—*i.e.*, splanchnic paralysis—to bacterial invasion, to a loss of a necessary function of the parts involved, to the formation of peculiar poisons, to dehydration by vomiting and diarrhea, etc.

The problem was made more concrete by the work of Draper. Draper was experimenting with a twine triangular stitch which was to take the place of the elastic ligature devised by McGraw for performing a gastroenterostomy and was confronted with the difficulty that all his animals operated as in Fig. 1 died before seventy-two hours, the time which he found to be

idea that the toxin is a normal product of the duodenum, which under normal conditions is neutralized or detoxified by the jejunum. As we shall see, his idea may not be so far from the truth, although his

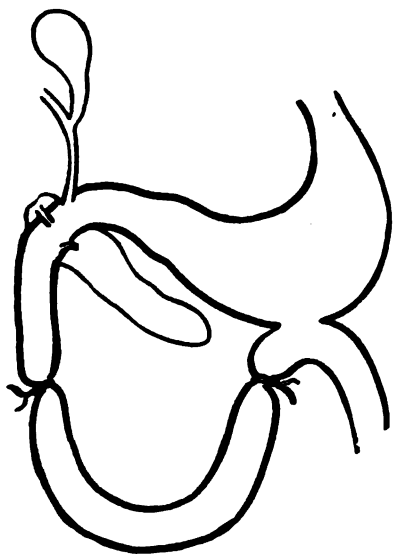


FIG. 4.

necessary for the twine stitch to cut a stoma between stomach and bowel. On the other hand, animals operated as in Fig. 2 lived, and animals operated as in Fig. 3 lived as well. In other words, animals lived in which a blind end of the duodenum longer than 35 cm. from the pylorus was made, while if the blind end was less than 35 cm. in length measured from the pylorus, the animals died. In the first 35 cm. of the duodenum some changes therefore take place under the conditions of obstruction which cause the death of the animal. Draper's further attempts at solving the problem were directed along the line of his

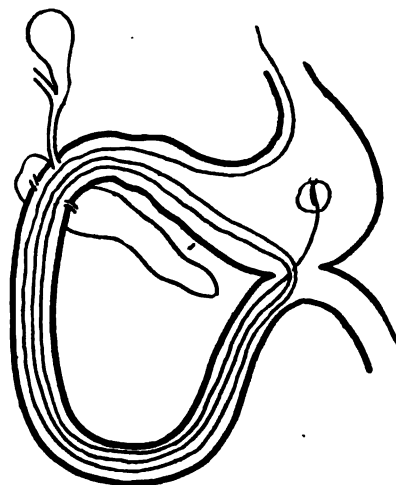


FIG. 5.

attempts to prove his point have not been convincing.

Whipple, Stone and Bernheim, of Baltimore, approached the subject by a slight modification of Draper's method. To an ordinary gastroenterostomy is added a double ligation of the gut at the points shown

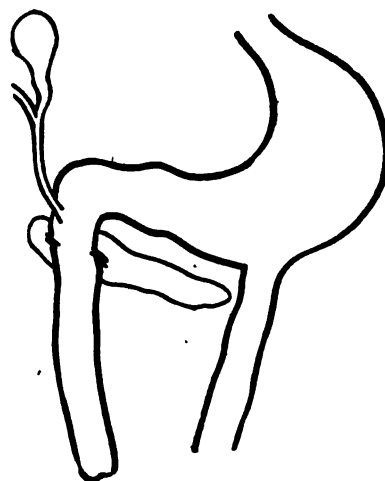


FIG. 6.

(Fig. 4). On the death of the animal this isolated loop is found to contain a powerful poison, which, free from bacteria, on injection into a normal animal will cause its death with the typical symptoms of high

obstruction. This finding would seem to rule out all the other theories which do not include the action of a definite poison.

The first point which interested us concerns the question, of general surgical interest, Does a gastroenterostomy opening really function in the presence of a normal pylorus? In spite of the work of Kelling and of Cannon, who by their *x*-ray studies

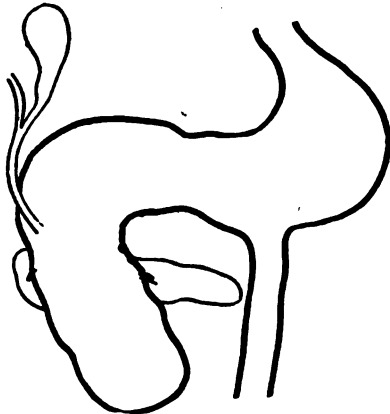


FIG. 7.

concluded that such an opening does not function in the presence of a normal pylorus; in spite of the work of Draper, who reported the experiment shown in Fig. 5, in which a string attached to a bolus of food

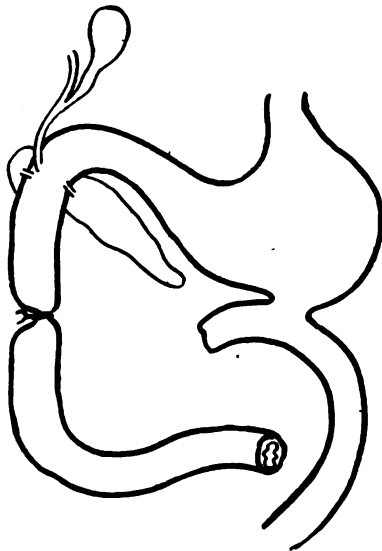


FIG. 8.

shows at autopsy that it has followed the normal course of the food, there was two or three years ago but a small number of surgeons who believed that the food fol-

lowed its normal course. Whipple, Stone and Bernheim seemed to take for granted that the gastroenterostomy opening drains the stomach and upper gut, above their first ligature. It was, however, in our opinion a question whether they were not really studying a condition of functional obstruction of the upper duodenum as well as an actually obstructed portion. If such were the case, their finding of a toxin within this loop would not necessarily mean that it had been formed there; it might just as well have been formed in the functionally obstructed portion and excreted into their closed loop. The fact that they found no toxin in a closed loop, the mucosa of which had been destroyed by sodium fluoride,

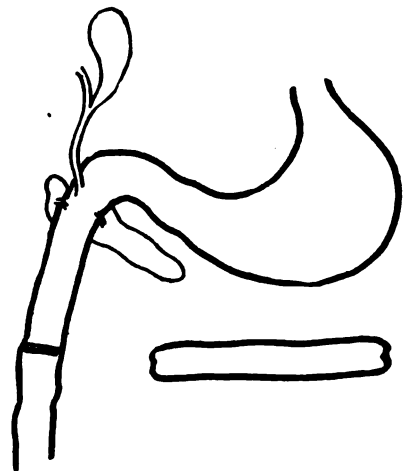


FIG. 9.

would not add further proof, for the destruction of the mucosa would destroy both possibility of formation in the loop and the possibility of excretion into the loop. We therefore tried the experiment shown in Fig. 6. If this operation be done on a series of animals, doing either the end-to-side pictured, or the ordinary lateral gastroenterostomy, it will be found that some of the animals will die with all the symptoms of high obstruction; and in those that live, either an enormous dilatation of the duodenum, as shown in Fig. 7, will be found at autopsy, or perhaps less dilatation but striking hypertrophy of the muscular layers of this segment of the duodenum.

It is only this functional obstruction of this first segment of the gut, in Whipple,

Stone and Bernheim's experiments, it seemed to us, which could explain the finding which they report after the operation shown in Fig. 8. They report that death follows, even though the isolated loop be drained to the exterior, and even though it be washed out freely.

We then followed the technique shown in Fig. 9, by which, instead of doing the gastroenterostomy with its functional obstruction, we isolated the same area of the duodenum as did they, but restored the continuity of the tract by an end-to-end suture, and we found that we could drain the loop at either end, and the animal remained perfectly well. We have had several instances in which the animal has lived for weeks with this loop closed at both ends; we have had many instances in which the animal lived for a week or ten days; we have drained into the bowel below by doing an end-to-side to a point of the bowel lower down, and nothing happens. We find that such loops, entirely closed, tend to become enormously distended with fluid, and our present opinion is that it is only because of such distention and consequent rupture that our animals with closed loops die.

Now if a loop of the lower ileum be closed off, the continuity of the tract being restored by an end-to-end around the loop, it will be found that the animal will survive for long periods. This was shown by Halsted years ago. We have found that if we make such a low loop, and fill it with pancreatic juice, or with a fresh dog's pancreas, the animal may die in the time limit, and with the symptoms characteristic of high obstruction. But this experiment is not conclusive of the rôle of the pancreas or its ferments in the production of the poison in question, for we may have added only the necessary pabulum for the intestinal bacteria. Let us look for a moment at the chart Fig. 10, which shows the toxic products of proteid digestion. Highly toxic properties have been found in the proteose stage of protein digestion. The normal ferments of the stomach and the normal ferments of the pancreas can, of course, break a protein down to this stage; nor-

mally it is supposed that the gastric digestion carries the proteins of the food to the peptone stage, from which the digestion is carried to the amino-acid stage by the fer-

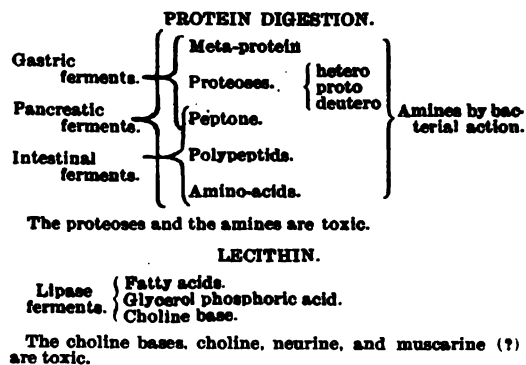


FIG. 10.

ments of the pancreas and the intestine. The intestinal juice is not supposed to contain any proteolytic ferment except the ferment erepsin, which can digest the protein casein, but no others, while its chief function is to digest the proteoses to the amino-acids. But either gastric or pancreatic ferment is capable of producing a toxic proteose. In addition, many bacteria can digest the protein building-stones to the highly toxic amine compounds. Further, the substance lecithin can, by the action of the fat-splitting ferment lipase, be broken down with the formation of the choline bases, some of which, such as choline and neurine, are highly toxic.

Whipple and his associates have recently published a work which proves that the toxic body found in their high loops is a proteose, and they have further shown that this purified proteose will exactly reproduce the symptoms of high obstruction when injected into a normal animal.

Now Whipple's contention that the toxin involved is a proteose makes it still more difficult to understand his previous ideas that this toxin is formed in the intestinal loop, or by the mucosa of the intestinal loop. For the formation of a proteose a proteolytic ferment is essential, and the mucosa is not supposed to contain any proteolytic ferment except the ferment erepsin, which is supposed to break down, not form, the proteoses. We have found this so-

called proteose in our own loops in animals operated as in Fig. 9. and, nevertheless, we are not prepared to admit that this toxin can be formed without the assistance of a proteolytic ferment.

We are inclined to rule out the gastric digestion because of the experiment shown in Fig. 11. In animals in which, a long time previous, the ducts of the pancreas have been tied, so that for a long period no pancreatic ferments have been entering the intestine, an absolute high obstruction, without the formation of any loops, was produced. Three such animals have lived

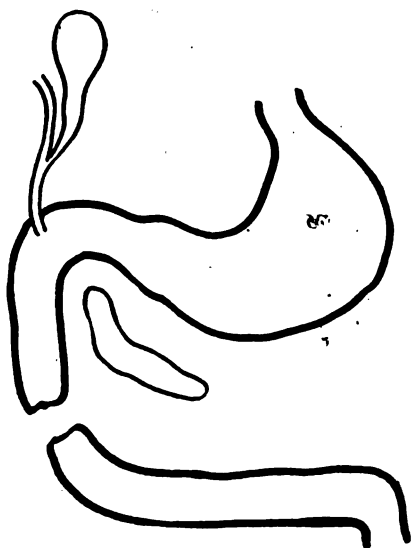


FIG. 11.

for seven and eight days, instead of the two to three days a normal animal will live with such an obstruction. Further, we have obtained a toxic material from loops of intestine in such animals which had no external secretion of their pancreas, but it was not a proteose. From the symptoms produced it would seem that this poison belonged in the class of the choline bases. The intestinal juice, while it contains no proteolytic ferment capable of producing a proteose, does contain a lipase. An animal in which the operation shown in Fig. 11 has been done should have the products of gastric digestion, which products might contain a proteose, but the fact that they do not die with the symptoms of high obstruction leads us to rule out the stomach.

Two findings in the course of this work have, therefore, interested us surgically. First, the added demonstration of the fact that a gastroenterostomy opening does not function in the presence of a normal pylorus. The second, the explanation of the similarity between acute pancreatitis and acute high obstruction—they are alike because they are both essentially the same thing, an intoxication with the toxic products of protein cleavage, in pancreatitis certainly due to the proteolytic ferment of the pancreas, in high obstruction not necessarily perhaps, but in our opinion in all probability, the same toxin, produced by a similar ferment. In pancreatitis the escape of the products of the digestion of the pancreas into the tissues permits the intoxication; in obstruction the conditions of obstruction permit the absorption of toxic products, which under normal conditions would either not be formed, or if formed would be immediately broken down to non-toxic products.

You will notice that the work on high obstruction has largely centered around the mechanical or purely surgical side: the effort to find out why this particular portion of upper duodenum is involved. Our own work at the present moment tends to lead the problem quite away from the purely mechanical point of view. We have found, for instance, that the intestinal content of an animal, after the removal of the adrenals, contains what is apparently the same poison, no obstruction being present in the intestines, simply double adrenalectomy. Further, the poison can be isolated in sufficient amount to kill a normal dog from the intestinal content of a normal dog killed by an intravenous injection of a minimum fatal dose of poison prepared from a loop, and this can be continued on through several dogs. Indeed, as far as our experience goes, it would seem that this process could be continued indefinitely if we possessed a sufficient refinement of chemical technique for the isolation of the poisonous substance.

It would seem from these observations, therefore, that the same or a similar toxin

can be formed in the intestine or found in the intestine under other conditions than those of actual obstruction, and that on intravenous injection of the sterile poison it reproduces itself in the intestine or reproduces the conditions under which it was originally formed. It would seem further that these observations rule out bacterial infection as a factor in the production of the poison, for the finding of a fatal dose of poison in the intestine three or four hours after the intravenous injection of the sterile toxin makes it seem very unlikely that bacteria can have produced it, and the relation of adrenalectomy makes it seem further highly probable that we are dealing with some perversion of some natural process, just as in acute pancreatitis we are evidently dealing with a perversion or dislocation of a natural process.

Many of you are no doubt wondering what actual practical value this sort of work has. Many of you will not in your hearts agree with me that my standard of surgery is a possible standard for the man who has to earn his living by the actual practice of surgery. Many of you no doubt would ably argue the point whether we should attempt to teach students the ideal or the practical; that since four years is a short period, and most graduates in medicine go out to practice and must know what to do when the occasion arises, therefore we should teach them what to do rather than the theory of why to do it.

Now there are certain eminently practical points to be learned from these purely experimental studies. The first point I would bring out of this relates to the treatment of high obstruction. It has been shown experimentally that animals with high obstruction can be kept alive for periods of time far in excess of the normal time such an animal will live, by the introduction into the body subcutaneously or intravenously of large amounts of saline solution. Therefore in the treatment of cases of high obstruction intravenous saline should be used freely. The second point concerns the treatment of the obstructed gut itself. There seems to be some ques-

tion in the minds of practical surgeons as to whether they should content themselves at operation with simply freeing the obstruction and allowing the content of the obstructed portion of intestine to pass along down the normal channel, or whether it should be removed by opening the intestine. The demonstration of the presence in this fluid of obstruction of a poison so potent that a relatively small dose, comparable in its toxicity to that of strychnia, quickly kills a normal dog, would seem to clearly answer this point. The toxic fluid should be removed from the body. In fact it seems strange that surgeons should even raise this question, since they all know that one of the most effective clinical procedures in the treatment of high obstruction is the free use of the stomach-pump, and the removal thereby from the stomach of the products resulting from obstruction.

The second practical point I would bring out relates to a problem which I have not discussed as yet, the transfusion of blood. In the earlier history of the operation for transfusion I find that it was recommended to inject blood directly into the peritoneal cavity. One can find records of some thirty-seven cases thus treated, with apparently as good results as are found in the modern reports of transfusion operations. We became interested in the question of what becomes of the blood or blood-stained fluid so frequently left behind after operations in the peritoneal cavity, and which, if an autopsy is done twenty-four hours later, is found to have entirely disappeared. We found that the older pathologists taught that blood cells are taken up from the peritoneal cavity and returned to the circulation; that the younger pathologists believe that these blood cells are removed from the peritoneal cavity by the same processes of hemolysis and phagocytosis which are seen after the introduction of alien blood. We found that those who had specifically worked with the problem had traced blood cells into the lymphatic apparatus of the diaphragm, and had then lost them in their further passage toward the circulation. We placed a cannula in the thoracic duct

and then injected defibrinated blood into the peritoneal cavity. We found that in about twenty minutes blood cells began to appear in the thoracic lymph, and gradually increased in number until the lymph assumed the physical characteristics of blood itself. Therefore we feel that the suggestion for reverting to the old idea of intraperitoneal transfusion possesses certain advantages for certain types of cases, namely, those in which the transfusion is to be done for its general effect rather than for its effect upon the low blood-pressure. The simplicity of the operation of drawing blood from a donor, defibrinating, and simply injecting defibrinated blood intraperitoneally, makes the method more fool-proof than any of the techniques for transfusion which have yet been devised. If hemolysis occurs in the peritoneal cavity, the slow absorption of the products of hemolysis would probably do far less harm than if the hemolysis occurred in the circulating blood. If a clot or two is injected it would certainly not produce embolism.

A third point of practical importance relates to the peculiar advantages possessed by such a department of work in that every operative case sooner or later comes to autopsy, and that the surgeon therefore not only autopsies his mistakes or his misfortunes, but what is much more to the point, autopsies his successes. If I could have it so, I would make every surgeon perform his most beloved operation upon a series of animals, and then after two or three weeks I would show him on the autopsy table that a perfect clinical result by no means proves a perfect surgical result. The most amazing lesson taught by experimental work is not what surgery can do to assist nature, but what nature does to assist, counteract, and overcome surgery. The crucible of the clinic does not compare with the crucible of the experimental laboratories. I repeat—a perfect clinical success does not necessarily mean a perfect surgery.

And finally, I still insist that the most important practical feature of the work of any department of research is the encouragement of the point of view, whether a

man is to go on into the field of pure investigation or whether he engages in the most routine country practice. The attitude of mind which causes him to wonder why, to refuse to accept things as they are, simply because they are, will not only lead him to an appreciation of the value of books, but will give to him the satisfaction at the end of having lived a life with wide-open eyes. In your struggle to keep up with the progress of knowledge, does it ever occur to you to think of the other side—the things we do not know about medicine? Will medicine be the better when the time shall come when “your young men shall see visions, and your old men shall dream dreams?”

INFLUENCE OF FRESH BILE FEEDING UPON WHOLE BILE AND BILE PIGMENT SECRETION.

In the *American Journal of Physiology* of January 1, 1916, HOOPER and WHIPPLE state that feeding fresh bile to bile-fistula dogs causes an almost constant cholagogue action. Bile of the dog, sheep, and pig all have this effect, and ox bile seems to be the most active cholagogue.

Fresh bile feeding as a rule causes a fall in the output of bile pigments in spite of the cholagogue action. Pig bile as a rule is most active in this respect, and may depress the bile pigment curve to less than half normal. Ox and sheep bile may have the same effect. Dog bile often causes only a slight fall in bile pigment output, but may depress the curve to 50 per cent of normal.

Hooper's and Whipple's experiments exclude the possibility of bile pigment absorption from the intestine. There is no evidence to support the theory of “bile pigment circulation.” These experiments give no support to Addis's theory of pigment conservation, urobilinogen absorption from the intestine and synthesis toward hemoglobin. It is suggested that urobilinogen may be formed in other body tissues rather than absorbed from the intestine.

Splenectomy does not influence any of the above reactions in bile fistula dogs.

EDITORIAL.

THE USE OF FOREIGN PROTEIN IN THE TREATMENT OF CHRONIC ARTHRITIS.

It has become increasingly evident as the years go by that only a comparatively small proportion of cases of so-called acute or chronic arthritis are really rheumatic in their nature. Certainly the great majority of the chronic cases are due to other causes—that is, to infections with different micro-organisms in different cases, or with a variety of organisms—and that the so-called micrococcus rheumaticus, which seems to be the factor in acute rheumatic fever, does not play as large a part as it was thought to play some years ago.

The readers of the GAZETTE will recall that some months ago we drew attention to several papers dealing with the effect of injected foreign protein substances in cases of acute and chronic arthritis, the most notable contribution being possibly that of Miller and Lusk. It will also be recalled that these investigators found that the injection of any foreign protein apparently resulted in such changes in the joints as to lead to benefit or cure in a certain proportion of cases, although, as a matter of fact, the protein which they used was typhoid vaccine, possibly because this was the most readily obtained vaccine which they had to hand. In their earlier communication they reported twenty-four cases to which they had administered this treatment. They have now reported an additional eighty-five cases with results that are certainly encouraging. In four cases of acute gonorrheal arthritis less benefit was derived from the treatment than in those cases due to other causes. They state that twenty-nine of the forty-five acute cases recovered promptly in the sense that pain, redness, and swelling disappeared in from one to five days, and usually within from twenty-four to forty-eight hours. Eight other cases showed great improvement with only some stiffness or slight pain. Six showed moderate improvement, and in two no benefit was obtained,

even although they received as high as thirteen injections. In the subacute arthritic group in which the condition had existed for a maximum period of four months, twelve patients were treated, and in ten this cleared up in from three to five days on one to four injections. In the chronic type with acute exacerbations nine cases were treated, and in eight the acute infections cleared up promptly after from one to three injections. Nineteen patients, with chronic arthritis varying in duration from a few months to several years, also received these injections, and ten showed definite improvement after from one to five injections, the patient being able to move about with much greater facility. Five showed moderate improvement and four were not benefited. Unlike acute gonorrheal arthritis the chronic gonorrheal cases seemed to be benefited.

Of course, it is not to be expected that this treatment will materially modify endocardial complications.

The method of treatment carried out by Miller and Lusk was the intravenous injection of from 40 to 75 million dead typhoid bacilli, although some practitioners have used much larger numbers than these. Even these doses, however, when given intravenously cause a very marked rise in temperature, followed by a severe chill, with headache and nausea. Some suffered from dyspnea, and in some the reaction was so severe that treatment was discontinued after a single injection. They believe that a poor myocardium, or marked hypertension, is to be considered as a contraindication to this treatment.

The interesting question arises as to whether it is necessary, to produce curative effects, to give doses so large as to induce these associated manifestations. As we pointed out in the previous leading article on this subject, it would seem to be definitely true that the injection of various forms of foreign protein are advantageous in a certain proportion of cases. It was

also pointed out in the article, to which we have referred, that phylacogen affords a means of administering foreign protein in a convenient and serviceable manner with a minimum of danger, provided the doses are properly gauged. We have repeatedly used so-called rheumatic phylacogen with very notable success in relieving pain in acute arthritis, using it only hypodermically, and in many instances have gotten no reaction of note, and never a reaction which was sufficiently severe to make us think it unwise to repeat the dose, giving hypodermically 2 Cc. to start with and increasing the dose by 1 or 2 Cc. daily, or on every other day, until 10 Cc. are given, if so large a number of doses are required.

In the treatment of all cases of arthritis therapeutic limitations must be constantly borne in mind. If the synovial membranes are chiefly involved the proposition is entirely different from one in which the joint itself is acutely invaded. It must depend upon the virulence of the organism, upon the resistance of the individual, and upon the changes which have taken place in various tissues affected before treatment is resorted to. Until some method of classifying or gauging these cases can be devised reports from different clinicians will vary widely. Diphtheria antitoxin is no longer expected to save the life of a patient suffering from a virulent form of the disease, unless it is given early enough to exercise its effect before irremediable tissue changes have occurred. The same thing holds true in regard to the use of phylacogen, or any method of treatment which is applied for the relief or cure of arthritic conditions.

SUBSTITUTES FOR SALVARSAN AND NEOSALVARSAN IN THE TREATMENT OF SYPHILIS.

The difficulties which have existed during the last few months in obtaining salvarsan and neosalvarsan have naturally turned the minds of members of the profession to the question as to whether satisfactory substitutes could be utilized. In Canada a preparation virtually identical with salvarsan is

now manufactured and widely sold, and during the time that salvarsan and its ally were practically unobtainable in this country Schamberg of Philadelphia placed upon the market a substitute or identical preparation which, since the introduction of a new supply of salvarsan, has had to be withdrawn under the patent law. Both the preparation made in Canada and that made in Philadelphia have given fully as good results as those made in Germany, but at the present moment cannot be obtained in the United States.

Some years ago no less a leader than the late J. B. Murphy of Chicago advocated the use of cacodylate of sodium in large dose in the treatment of syphilis, claiming that he had obtained excellent results from its employment. Because of its comparative cheapness and the ease with which it can be obtained a large number of practitioners have followed his footsteps, and, in some instances, the hypodermic administration of cacodylate of sodium in syphilis has seemed to be distinctly beneficial. The point, however, is as to whether it is distinctly curative in the sense that it is capable of destroying the spirochete of syphilis.

Notwithstanding the high hopes which we had when salvarsan was first introduced, to the effect that this new compound would destroy every spirochete in the body, hopes which were speedily dashed to the ground by experience, it would, nevertheless, appear that salvarsan or neosalvarsan is the most efficient destroyer of the spirochete that we have, unless possibly sodium salvarsan, a still newer compound, proves ultimately equally efficacious.

So far as the cacodylate of sodium is concerned, the point is not as to whether the patient improves under its use, but whether the spirochetæ in his body are promptly destroyed so that he ceases to be a disseminator of the disease and ceases to be a hotbed for the multiplication of the spirochetæ, which will attack his own tissues. Recent investigations have seemed to indicate that as a destroyer of spirochetæ cacodylate of sodium is powerless. Nichols,

Cole, and others, the first using animals and the latter experimenting with mankind, have proved that its spirocheticidal property is almost, if not quite, *nil*; that it does not change a positive Wassermann test into a negative test, nor heal the mucous patches which so frequently disseminate the disease. While it may exercise some good effect upon the skin lesions of syphilis, these effects do not approach those induced by mercury or potassium iodide, and these facts apparently hold true even when the dose which is given is larger than is commonly thought safe.

These facts are by no means surprising when we consider the nature of cacodylate of sodium. While it is true that by its use we can inject into the body a greater amount of arsenic than we could with safety if the older preparations of arsenic are used, it must be borne in mind that this is because the cacodylate of sodium is broken up with so much difficulty and gives off its arsenic so slowly that, while the dose which is injected may be large, the dose of active arsenic which the body receives in general is comparatively small. Cyanide of potassium is exceedingly poisonous, but ferrocyanide of potassium is innocuous, not because the hydrocyanic acid in one compound is any less powerful than the other, but because the latter compound is so stable that practically no hydrocyanic acid is set free after the compound is ingested.

In this connection an interesting question arises as to whether neosalvarsan can be considered as an efficient substitute for old salvarsan. There has been in the past much difference of opinion in regard to this matter, based possibly upon clinical observation without great accuracy, and upon the fact that the manufacturers of neosalvarsan admit this to be the case, and direct that larger doses are essential if effects similar to those induced by salvarsan are to be obtained. Trimble and Rothwell have attempted to decide this point by careful investigation of syphilitic patients. They believe that they have proved that there is no great difference in the therapeutic value of the two preparations, and, because of the

ease with which neosalvarsan is administered and the small quantity of liquid which must be injected when it is employed, they believe that it is the superior compound. So far as we know, this seems to have been the general opinion of many competent practitioners with the proviso that the dose has to be larger than that of salvarsan. That is, the compound neosalvarsan does not provide the arsenic in sufficient quantity and in proper form to accomplish the results induced by salvarsan unless a larger dose is used.

It is interesting to note a point which most workers in this field have already emphasized, namely, that Trimble and Rothwell believe that four injections of salvarsan or neosalvarsan in the treatment of syphilis are quite inadequate, and that the use of these drugs, unless they are followed by mercury, is also inadequate. These facts cannot be too widely disseminated. Doubtless fifteen or twenty years from now many cases of syphilis of the nervous system will be met with in patients who have been assured that they have been cured by the administration of salvarsan or neosalvarsan, but in whom the infection has only been submerged and not eradicated, as it would have been had mercury been faithfully employed. There seems to be little reason for considering that a patient with a well-established infection is safe, so far as his own constitution is concerned, any sooner to-day, since the introduction of salvarsan, than he was prior to its introduction. This may be a somewhat exaggerated way of stating the matter, but it serves to emphasize what we have constantly taught, namely, that salvarsan may be compared to a chemical engine, which is efficient in putting out a fire in its early stages which threatens great damage, whereas mercury is to be compared to the fire engine, which is always called upon to eradicate a conflagration which is actually in its full vigor.

Finally, it would seem probable, from our increasing knowledge of various infections and from what we are continually learning concerning the activities of salvarsan, that

all syphilitic infections are not identical in virulence and that some strains of spirochetæ are much more insusceptible to anti-syphilitic remedies than others.

We are glad to see that Baum, of Syracuse, and Schamberg, of Philadelphia, have recently emphasized this point and have also called attention to the fact that certain strains of spirochetæ have a greater affinity for certain tissues than for others. Ever since Rosenow showed so clearly that microorganisms dwelling in certain tissues develop an affinity for similar tissues in other hosts it has seemed likely that spirochetæ derived from mucous membranes would have an affinity for these tissues which will be greater than spirochetæ derived from the vascular, renal, or hepatic tissues, and this, perhaps, explains why salvarsan seems so efficient in one case and so feeble in another; the most noteworthy instance being in so-called late syphilis of the central nervous system, in which Noguchi has proved the presence of living parasites in the perivascular spaces, in which spaces the salvarsan, either directly or indirectly, seems incapable of thoroughly exercising its powers.

ANTISEPTICS, BACTERIA, AND TISSUE CELLS.

Ever since the discovery of bacteria as a cause of disease medical men have been hoping that some antiseptic substance might be discovered which would have a more deleterious effect upon invading parasites than upon the cells of their hosts. From time to time certain bold spirits in quest of such a method of treatment have gone so far as to inject into the tissues, or even intravenously, substances which are known in the test tube to act as germicides, ignoring the undeniable fact that as a class bacteria are infinitely more tenacious of life than the highly specialized cells of the human body, and that, therefore, the introduction of germicidal substances in the body in sufficient quantity, or strength, to destroy invading parasites will first destroy the tissues of the host. Formaldehyde,

corrosive sublimate, and many other powerful germicides have been so used, sometimes with disastrous effects, and sometimes with no effect at all if they were sufficiently dilute. In future there is good reason to believe we may discover germicides or antiseptics which will have such a specific affinity for the protoplasm of certain bacteria that these bacteria will be destroyed, leaving the protoplasm of the patient untouched. As yet, however, we have only two substances which approach this much-to-be-desired ideal, namely, quinine on the malarial parasites, and salvarsan for the parasites of syphilis, and even these two so-called specifics are capable of exercising such a deleterious effect upon other tissues which are naturally susceptible to their influence, or which are rendered susceptible by disease, that they are not in the class of innocuous remedies which we ultimately hope to obtain. Not only is this true as to bacteria which are widely scattered through the body, but it is also true in regard to localized infection. When antiseptic surgery first came into play it was not infrequent to see wounds treated with such strong solutions that healing was materially delayed and even necrosis induced.

In the *Journal of Experimental Medicine* of December 1, 1916, Lambert contributes a paper in which he throws considerable light upon the comparative resistance of bacteria and human tissue cells to certain common antiseptics. He studied connective tissue cells and wandering cells derived from human beings *in vitro* in modified plasma, using tuberculous glands and Hodgkin's disease glands removed at operation, and spleens taken out at autopsy a few hours after death. The organism which he employed was the staphylococcus aureus, which he chose because of its frequency in infections and because certain investigators have shown that it occupies a middle position among pathogenic bacteria in its resistance to disinfectants, being more resistant, for example, than the streptococcus and less resistant than the bacillus pyocyaneus. He used two strains of staphylococci, one from the throat of an

apparently healthy individual, another from a case of furunculosis, and found that there was little difference in the resistance of these two strains to the chemical used. The substances which he employed were mercuric chloride, potassium mercuric iodide, potassium cyanide, Dakin's solution, iodine, phenol, trikresol, argyrol, hydrogen peroxide, glycerol, and alcohol.

It is interesting to note that iodine stands out as the one chemical to which the cells of the body were found to be more resistant than were staphylococci. Thus a growth of cells occurred after exposure to a 1:2000 solution of iodine for one hour, although this strength of iodine was sufficient to sterilize the tissues completely in most instances so far as the growth of staphylococci was concerned. Lambert, therefore, concludes that iodine approaches closely an ideal disinfectant, since it kills bacteria and does not seriously injure connective tissue cells or wandering cells. On the other hand, both iodine and Dakin's solution possess the power of dissolving fibrin and would therefore seem to be disadvantageous in that the wound is deprived of the natural plastic substance which facilitates healing.

CLINICO-BIOLOGICAL RELATIONS OF THE SPERMATOZOA.

The attitude of the profession at large concerning spermatozoa is to the effect that they look like tadpoles, live long under favorable conditions, quickly perish as the result of the application of any antiseptic or acid, and that provided they move they are undoubtedly capable of fertilizing an ovum. An unfertile marriage is usually attributed to defect on the part of the woman, a man being cleared as a deterrent factor if he has any motile spermatozoa in the ejaculation.

Much detailed information has been collated by Lespinasse (*Mississippi Valley Medical Journal*, March, 1917) which tends to a larger conception of the morphology of the spermatozoa and to a broader view as to the possibility of departures from

normal other than immotility which may render it inapt in fertilization. He notes the presence of a head and a tail and an indistinct neck-piece. In the tail there is a connective piece, a principal piece, and an end piece. Seen from the surface the head is oval, and in side view it is elongated, pear-shaped, the tail being attached to the broader end; upon each surface of the head there is a slight depression. According to Waldeyer one sees a constriction between the head and the connecting piece which is an indication of the neck. By staining, the head cap can be brought into view, its posterior border marking off an anterior and a posterior portion of the head. The anterior sharp border of the cap represents the perforatorium; the neck is in the form of a disk, which is formed by the anterior centrosome bodies, the noduli anteriores, and a homogeneous intermediate substance, the massa intermedia. The succeeding connecting piece begins with the noduli posteriores (the posterior centrosome bodies) and ends with the annulus, and includes, therefore, the region of the posterior centrosome, which during spermatogenesis has divided into these two portions. The filum principale of the tail traverses the axis of the connecting piece, extending to the proximal portion of the posterior centrosome. In this region the filum principale has a delicate investment which probably passes over posteriorly into the thicker sheath of the tail and finally ends at the beginning of the filum terminale. Around this delicate sheath is the spiral sheath, and external to this the mitochondria sheath. The spiral sheath consists of a spiral filament, not recognizable in the mature spermium, and an intermediate substance, the substantia intermedia. The mitochondria sheath is the matrix of the spiral filament and is characterized by the presence of mitochondria granules. Beginning with the principal portion of the tail the spiral and mitochondria sheaths terminate, but the inner thin sheath is probably continued into the involucre of the tail. The tail constitutes four-fifths of the entire length of the spermatozoon. Digitized by Google

After quickly repeated intercourse variation in the size of the heads of the sperm are relatively common; occasionally they are double-headed. Few of these sperm with large heads have a normal motility; most of them have no motility at all. The neck-piece is frequently enlarged and thickened, so much so that it appears as a collar. Timed to cross the one-sixth field, the spermatozoa make this journey in about eight to ten seconds when the semen is about one hour old. In four to six hours there is usually immobility, the motion becoming more and more undulant.

The sperm was the first cell to which antibodies were developed. Hence the spermatozoon is the father of the Wassermann reaction. Minor degrees of defects in the sperm are common. Thus it may take the individuals fifteen to twenty seconds to cross the one-sixth field. Under such circumstances the use of pituitary gland in doses of from 20 to 100 grains daily seems serviceable. Direct uterine insemination may be indicated.

Duhrssen observed live sperm in a diseased tube nine days after the patient came into the hospital and three and a half weeks after the last intercourse. They have been found motile in a testicle three days after death. Ahlfeld kept the sperm alive eight days at body temperature. They swim against a current (rheotapic), the current exercising a directing force. Even dead spermatozoa lie with the head against the current. Waldeyer notes that in $7\frac{1}{2}$ minutes spermatozoa will cover a distance of 27 mm. There is an average of about 60,000 sperm per c.mm., which will be about two to three million sperm in an ejaculation. It is estimated that in the lifetime of man he produces 340 billion spermatozoa, and as woman produces about 200 ova in each ovary during her lifetime there is produced for each ova 850 million sperm.

As a conclusion to this interesting summary on the morphology and movements of the spermatozoa, the author concludes that even motile spermatozoa may be unable to fertilize ova; that a careful examination

by a skilled examiner may detect errors in the formation or motility which may be corrected by administering pituitary gland. He believes that in some cases the slow movement is responsible for the failure to impregnate, and that direct uterine insemination is indicated here.

It is doubtless true that in exceptional cases motile spermatozoa may be unable to fecundate. Clinical evidence seems clearly to show that spermatozoa which fail to impregnate one woman may successfully operate in the case of another, and *vice versa*—i.e., the woman who has not become fertile with one strain of a spermatozoa may readily become so from another; this showing that both a woman and a man may be potentially fertile, but not so one to the other.

Examination of any emission usually shows wide variations in form, outline, size, and motility of the individual spermatozoa. It seems fair to assume that while some are dead, others moribund, and others non-fertile, of the three million contained in an ejaculation many would be found entirely normal and entirely capable of performing their function. It yet remains to be proven that a man in whose emission are found actively or even sluggishly motile spermatozoa is incapable of impregnating a potentially fertile woman.

SALVARSAN TREATMENT OF SYPHILIS.

In spite of the now recognized fact that salvarsan varies both in strength and toxicity, as do all similar compounds to an extent, and in spite of the fact that its use even when most skilfully applied is attended by possible dangers, this drug is given not only by the expert but by the bulk of the profession, and with a degree of safety which is astonishing considering its potentialities for harm. Individual records are therefore of vivid interest, and the report of Lloyd Jones and A. J. Gibson (*British Medical Journal*, Feb. 3, 1917) on 200 cases of primary and secondary syphilis treated by intravenous injections of salvarsan and

intramuscular injections of mercury between May 22, 1916, and September 24, 1916, is worthy of note.

The method was that laid down by the War Office and was divisible into three parts:

Part A calls for 8 doses totaling 1 gramme of mercury; 2.8 grammes of salvarsan; given in 52 days.

Part B, 14 days potassium iodide.

Part C, eleventh to thirteenth week; three doses of mercury; 1.2 grammes of salvarsan; given in 15 days.

The full course of treatment is as follows:

First week, 2 doses of salvarsan (0.3 gramme); 1 dose of mercury. Second week, 2 doses of salvarsan (0.3 gramme); 1 dose mercury. Third week, 1 dose of mercury. Fourth week, 1 dose salvarsan (0.4 gramme); 1 dose mercury. Fifth week, 1 dose salvarsan 0.5 gramme); 1 dose mercury. Sixth week, 1 dose of salvarsan (0.5 gramme); 1 dose mercury. Seventh week, 1 dose salvarsan (0.5 gramme); 2 doses mercury.

In a large percentage of cases a negative Wassermann reaction and absence of all clinical signs and symptoms have been obtained by the end of Course A. If the Wassermann reaction is still positive at the end of Course A, potassium iodide in 10-grain doses, three times a day for fourteen days, is then prescribed. If still positive Course C is given.

All the cases treated were conclusively shown to be syphilitic by the Wassermann being positive, or the presence of spirochætae pallidæ in either primary sore or secondary rash. None were treated on a purely clinical diagnosis, unless the signs put the diagnosis beyond all doubt.

The 200 cases were composed of 125 primary and 75 secondary; not picked cases, but the first 200 treated in the course.

At the end of Course A, of the 125 primary cases, 16, or 12 per cent, showed a positive Wassermann. In 75 secondary cases, 43, or 55 per cent, still showed a positive, and 32, or 45 per cent, a negative Wassermann reaction.

Of the 43 secondary cases showing a

positive reaction at this point, 16 ceased treatment for the following reasons: Eleven were showing marked symptoms of stomatitis, having had large quantities of mercury before this course; three had marked albuminuria; one refused more treatment; and in one the treatment was stopped owing to the violence of the reaction. At the end of Course B with potassium iodide the following results were obtained:

Of the 16 primary cases with a positive reaction, six, or 38 per cent, still showed a positive, and 10, or 62 per cent, showed a negative Wassermann reaction; two of these six cases ceased treatment owing to stomatitis.

Of the 27 secondary cases with a positive reaction, 16, or 59.3 per cent, still showed a positive, and 11, or 40.7 per cent, showed a negative Wassermann.

At the end of Course C (further treatment with 1.2 grammes salvarsan and 3 grammes mercury) the following results were obtained:

All the primary cases, which numbered four, showed negative reactions, and of the 16 secondary cases 10, or 62.5 per cent, were still positive, and six, or 37.5 per cent, were negative.

Of the 200 cases which started treatment, 182 completed the full course where necessary. Of these 172 had negative Wassermann reactions, namely, 123 primary, or 98.4 of those starting, or 100 per cent of those completing the full course; and 49 secondary, or 65.3 per cent of those starting, or 81 per cent of those who completed the full course.

It is possible that a certain number of the secondary cases may show a negative reaction in a short time, as the final blood tests were taken directly the course had been finished.

The reactions shown by the patients under treatment with salvarsan twenty-four hours after the patients had an injection may be grouped under the headings mild, severe, and local. The figures used are obtained from the 200 cases already quoted; in all 1320 injections were given.

Of the mild reactions headache was

noticed in 27.3 per cent of the injections; diarrhea in 29.3 per cent; vomiting some time after injection, 15.3 per cent of injections; abdominal pain, 18.4 per cent of injections.

The authors cheerfully class these symptoms as neurotic or due to an improper diet.

In the second group of severe reactions they include cardiac, respiratory, and central nervous symptoms, vomiting at once, rash, rigors, severe diarrhea, albuminuria.

Cardiac and vascular symptoms were typified by flushing of the skin and widespread vascular dilatation, tachycardia, and bradycardia; irregular pulse; often dyspnea and a muddled mental condition.

Respiratory difficulties were for the most part subjective. Dyspnea and paroxysmal cough were noted, the latter starting immediately, with shortness of breath.

The nervous manifestation may take the form of unconsciousness either immediately or some time after the injection. Transient hemiplegia was observed once and lasted three days.

Immediate vomiting seems to be akin to the paroxysmal cough, starting as soon as the injection is commenced. This condition was met with three times in the same man, who was of rather a nervous temperament; he finally had to stop treatment owing to the severity of his reactions. He exhibited at different times upon the table vomiting, flushing, slow pulse, semiconsciousness, and all four at the same time.

Diarrhea was at times troublesome, and some patients suffered from a mucous colitis, with the passage of blood-stained mucus for a few days.

Rash may appear in the form of erythema, which is a warning to moderate the doses; urticaria, which completely disappears; herpes, facial or labial, not uncommon. One case developed acute exfoliative dermatitis.

Rigors usually occur two to six hours after injection and last for about twelve hours, the temperature running even up to as high as 102°.

Albuminuria is usually transient.

Rash and rigors are the commonest forms

of severe reaction, and thereafter diarrhea. These reactions are exceptional. It is not that acute neuralgia occurs during injections of salvarsan, due in all probability to the fact that the gums are inflamed with mercury, although they may show no outward signs of inflammation. The pain quickly passes away at the end of the injection, and leaves no after-effects.

As to the local reactions, local bruising and hematoma are due to the operator injuring the vein to a greater or less extent at another point to that through which he finally introduces the needle. This may be avoided by introducing the needle through the skin first and then passing it through the lateral wall of the vessel. By this means the vein does not slip away from the needle-point, as it has a tendency to do when an attempt is made to get into the lumen in one motion from above.

Lymphangitis is due to local infection and should not occur. The same is true of abscess formation. Necrosis at the seat of injection is due to allowing the injection to run into the cellular tissues around the vein. This can be avoided by first running in distilled water to make sure that the needle is in the lumen. If by chance the needle slips out during injection, owing to the patient moving, it is best to take a scalpel and open over the swelling and thoroughly clean out any solution loose in the tissues. The incision made will heal much more quickly than the necrosed area that will otherwise appear.

Thrombosis is due in a large percentage of cases to rough usage. One man whose veins were easily punctured had a local thrombosis after each injection. Sometimes thrombi sometimes form during the injection, and it is then dangerous to proceed. One first sign of local thrombosis in such a case is hindrance to the flow from the needle.

The practitioner should be cautioned against stopping injections too soon. The general tone and appearance of the patient improve markedly after one or two injections of salvarsan, and the primary sore disappears. If the injections are stopped

too soon relapses will occur with almost absolute certainty. The treatment should be continued until all signs of reaction have disappeared and the blood reaction is negative.

Mucous membrane lesions of the mouth and tonsils are affected less readily by salvarsan, and they do not usually heal until the blood has got to a negative phase. until the blood has got to a negative phase.

summation would have had added value if the practitioners had noted the body weight and the general vigor, both mental and physical, at the beginning and at the end of this somewhat intensive treatment. Although it is well to have a definite procedure and a fundamental standard dosage,

these require in the handling of spirochetal infection wide individual departures; otherwise certainly, in private practice, unfortunate results will occur.

The broad general principle in treating syphilis is to give as much of the specific medicines, to wit, mercury and arsenic, as is compatible with complete health; to avoid scrupulously even a beginning intoxication; to strive for a negative Wassermann in the primary stage of the disease; to be content with perfect health under repeated treatments in the secondary and tertiary stages. An enthusiastic effort to convert the positive Wassermann of an old healthy syphilitic into a negative is usually both futile and hurtful. Such patients should, however, receive intermittent treatment for life.

REPORTS ON THERAPEUTIC PROGRESS.

INDICATIONS FOR WET PACKS IN PSYCHIATRIC CASES.

ADLER in the *Boston Medical and Surgical Journal* of November 9, 1916, submits an analysis of one thousand packs given at a psychopathic hospital. He states that the wet pack, as it is usually given, consists of a number of sheets wrung out in water at about 100° F., and wrapped tightly around the patient's body and limbs—so that he cannot move anything except his head, fingers, and toes—and an outside wrapping of blankets pinned with large safety-pins, so that the patient cannot roll out of them. When the patient is so restless and active that in spite of this he is likely to fall out of bed in consequence of a flexion and extension of his entire body, a restraining sheet or blanket is placed over him and pinned to the sides of the bed, and the foot end of the pack may be attached by means of a blanket and safety-pins to the cross-bar at the foot of the bed. In this way the patient is completely trussed and practically immobilized. In fact, this is so obvious that the change from the violent agitation to the immobilization caused by the pack is so striking

that it must appear to many that the chief object of the pack is restraint, and is quite comparable to a strait-jacket or any other form of restraint. As will be seen later, nothing can be further from the truth than this conception, and yet the similarity seems so great that even the attendants and nurses—not to say the physicians—frequently treat the pack as a form of restraint, and order it as a means of relief for themselves or the other patients from the disturbances caused by one who is merely noisy.

Where the degree of excitement is such that the gentle effects of the prolonged bath are not adequate, the restraining influence of the pack may be required to put the patient in the condition for the prolonged bath. The wet pack is applied for two hours. The patient is then removed whether he be still disturbed or not. If the patient has not fallen asleep or is not completely restored to quiet and self-possession, he is then placed in the prolonged bath.

The ideal temperature for the prolonged bath is not over 98° F. and not under 95° F. The water should be kept continually at this temperature, and the body should be

immersed as far as possible in the water. The object of the pack is to produce an envelope of water or moisture-laden air at body temperature, and maintain this for the length of the pack. It has been shown that whether we start with cold water or warm water, the temperature of the pack readily adjusts itself to that of the body. In cases of maniacal excitement, even though the patient may have fever, the surface of the body is losing large amounts of heat. It is wise, therefore, to start with hot sheets rather than cold sheets—the idea being to conserve as much of the body heat as possible.

The patient should be given water to drink freely throughout the pack, and an ice-cap should be placed upon the head, and a cold compress on the forehead, which should be frequently renewed.

In cases of alcoholism or drug addiction, or in cases that have been exhausted by prolonged febrile diseases, there is a certain amount of danger from collapse in the pack. Following the experience in European clinics, as well as in this country, a hypodermic injection of digipuratum, or digalen, has been given almost as a routine in these cases. The ordinary preparations of digitalis, such as the powdered leaves, the tincture, or the extract, require sometimes as much as twelve hours before the effect is obtained. They are, therefore, useless for this purpose. The hypodermic preparations are much more prompt in their action, and have given excellent results. Since the outbreak of the war, however, it has been impossible to obtain these drugs except at prohibitive prices, and stimulation with strychnine or camphor has been resorted to in cases in which there seemed to be a danger of cardiac collapse. [Digitalone is an efficient substitute.—Ed.]

While the physicians who have been employing the pack in a proper fashion have all become convinced of the fact that it is a valuable therapeutic measure and in no sense to be compared to mere restraint, they have found this difficult to prove in individual cases; and in the face of charges brought by paranoid patients or their rela-

tives, they have found it difficult to vince a prejudiced bystander of the difference.

With this idea in mind, a closer study made of a thousand packs that had been given in the course of routine management of the patients, and the results of this study are herewith presented. These cases were gathered from unselected clinical material in the order in which they were given, and represent 309 patients. The diagnoses, organic and psychiatric, comprise a large variety, and only one factor was taken into consideration in the present analysis, namely, whether the patient was quieted by the pack or not.

According to this analysis, out of 309 cases, 155 were quieted by the packs, 154 were not quieted by the packs, 98 were quieted by some and not quieted by others, or, in other words, the pack had a partial effect.

For the sake of convenience, Adler grouped only the main classifications together. Cases diagnosticated manic depressive insanity and dementia præcox were very nearly equal in number—79 of the former, 82 of the latter. But 326 packs were given in the 79 cases of manic depressive insanity, with a quieting effect in 144, without quieting effect in 218 packs; whereas in the 82 dementia præcox cases, but 217 packs were given, with quieting effect in only 74.

The same disproportion is shown by the cases of manic depressive insanity showing agitated depression. In 8 cases 18 packs were given, 8 with quieting effect, 10 without quieting effect. In all the other groups, including general paresis, delirium tremens, alcoholic hallucinosis, and epilepsy, by far the majority of packs had a quieting effect.

It would seem, then, that excitement and conditions other than manic depressive insanity is to be considered rather a secondary manifestation, and one which is more easily controllable by hydrotherapy. Even in the cases of manic depressive insanity, of course, a quieting effect was obtained a large number of times, but

packs that were given without quieting effect outnumbered those that had a quieting effect, indicating thereby, also, that the duration of the state of excitement and the intensity of the excitement are greater than in the other diseases.

These results are quite different from those obtained by the use of restraint without hydrotherapy. It is unnecessary here to recall the remarkable improvement in the condition of excited patients produced by the modern methods of non-restraint, in which diversion and occupation take the place of padded cells, strait-jackets, and strong rooms.

More to the point, perhaps, will be the startling figures obtained in a study of the treatment of delirium by hydrotherapy at the Psychopathic Hospital, Boston, compared to the results of the older methods of restraint and depressing drugs without hydrotherapy, employed at general hospitals. The mortality in general hospitals averages 26 per cent; the mortality in the Psychopathic Hospital, under hydrotherapy, more especially packs, averages 0 per cent.

On account of these facts, it is safe to infer that hydrotherapy, whether applied in the form of prolonged baths or as wet packs, has a therapeutic effect, which is not to be obtained by mere immobilization of the patient or by restraint.

The question of restraint, of course, is an important one for administrative reasons. However, these figures prove that the wet packs not only cannot be condemned for reasons of cruelty, but that they are the most potent means of obtaining rest for a maniacal patient. The wet pack has been used at the Psychopathic Hospital consistently as an auxiliary to the prolonged bath, and bears the same relation to the latter that hypodermic medication bears to medication per os. A patient who cannot or will not swallow medicine may still derive the benefits from the drugs when they are administered subcutaneously. A subcutaneous injection of heart stimulant, for instance, may be applied against the wishes of an insane person. It may be

applied in cases of unconsciousness and so forth. It offers a means of applying a therapeutic agent without the coöperation or even the consent of the patient. In the same way the pack may be used to administer the beneficial effects of hydrotherapy, and in particular of the prolonged bath, to patients who are so restless or excited that they cannot be induced to submit to the prolonged bath.

TREATMENT OF CEREBROSPINAL SYPHILIS.

GROVE, in the *American Journal of Insanity* for October, 1916, after reporting cases of cerebrospinal syphilis treated by him, concludes:

1. It is too early in the modern treatment of cerebrospinal syphilis to draw definite conclusions, but evidence shown warrants the effort in early cases.
2. There is little to be hoped from treatment in advanced cases; hence the crying need of an early diagnosis.
3. Negative history and a blood negative Wassermann might prove misleading; hence the necessity for examination of the spinal fluid.
4. There is strong evidence to show that injurious effects might come from too large doses of antisyphilitic agents given intradurally.
5. That the thorough saturation of the system with antisyphilitic agents is the end hoped for—hence all methods of treatment should be relied upon used conjointly.

VACCINE THERAPY.

In the *Journal of the American Medical Association* of January 20, 1917, DAVIS points out what we have called attention to in our editorial columns, namely, that recent work tends to show that many substances, the so-called foreign proteins and their derivatives, may, when injected slowly into the veins, quickly cause a severe chill followed by high fever, leucocytosis, and certain changes in the blood, especially the appearance of ferments. These proteins

may be derived from disease germs or they may consist of other animal substances, as serum, proteoses, and milk. After the rather severe reaction, marked improvement and even permanent cure may result in certain diseases, especially typhoid fever, and in rheumatic and gonococcus infections. This may be due to the high fever and to increase in the ferments and leucocytes of the blood. Other factors are probably at work.

The non-specific effect of vaccines is just now probably the most important problem that concerns the vaccinationist. The possibilities of development along this line are many, for the principle concerns an immense number of diseases, both in man and the lower animals. Questions concerning ultimate cure, recurrences, relapses, and dangers cannot now be justly appreciated because of lack of data.

This form of treatment should be referred to neither as specific nor as vaccine therapy. It is non-specific, and usually, but not necessarily, protein therapy.

The important domain of vaccines is protective, not curative, according to present data.

IMPOTENCE IN THE MALE AND THE USE OF THE ANTERIOR LOBE PITUITARY BODY.

STELLWAGEN in the *New York Medical Journal* of November 4, 1916, states that his attention was first called to the use of pituitary body in general weakness by an observation upon a patient to whom the preparation was given in a purely empirical way. He was suffering from premature senile decay. The patient, a man aged forty-eight years, had some undefinable and unexplainable weakness for which anterior lobe pituitary body was given.

He showed decided improvement, and during the course of his treatment remarked that he felt a return of sexual desire, also that his powers of erection, which had been negative for some time, seemed to be returning. This latter fact he dwelt upon so frequently that it determined Stellwagen to

apply it in the treatment of such cases. He has tried the preparation in three cases of younger men suffering from sexual neurasthenia, but with no special improvement. This fact he does not attempt to explain but he feels that in them the nervous element so predominates that it governs the situation, and that unless some means are found to put it in abeyance, all methods of treatment must fail. In short, he has tried to impress upon them that they must be philosophical in order to gain by the treatment.

No untoward symptoms have been produced by the administration of the preparation, except slight hyperacidity of the gastric juice. In other cases now under observation this hyperacidity is present, consequently it may be of use in achylia gastrica. It is his intention at a later date to offer a more complete study upon another series of cases.

The fact that prostatic massage and some other remedies were used in the treatment of a number of his cases in a measure invalidates the testimony in favor of the anterior lobe pituitary body; nevertheless, he feels that the preparation played a very decided part in their cure. Indeed in some patients the effects were remarkable. Previous to its use, the methods that were resorted to generally failed. The dose employed averaged 5 grains three times a day.

PITUITRIN IN LABOR.

The *British Medical Journal*, of December 23, 1916, contains a communication from AGNEW in which he states that the article in the *British Medical Journal* of October 14, by Drs. Haultain and Swift, on the morphine-hyoscine method of painless childbirth, was very interesting to him. He happened to be engaged at an extremely prolonged and tedious confinement at the time. He had administered grain 1/100 of hyoscine in the first stage, and the patient got some much-needed sleep. As on previous occasions on which he had used the drugs, he was not satisfied that he had not prolonged the labor—probably he had given

the injection too early. It is quite evident, however, that the proper method of procedure, as summarized by Drs. Haultain and Swift, completely bars the use of morphine-hyoscine in private midwifery practice. This is unfortunate on account of the demand there is for "painless childbirth," brought about by the booming of the subject in the lay press. However, he is finding considerable satisfaction in the discriminate use of pituitrin. The injection of 0.5 Cc. in the late first stage acts like a charm. The initial pains resulting are often very severe and tetanic, often continuous, but soon subside and become more like normal pains. He is satisfied that a quick labor, such as often occurs after the use of pituitrin, is gratifying to the patient in every way. Chloroform can be used in addition, but instrumental labors in his practice are becoming surprisingly less frequent. In two recent cases of breech presentation pituitrin probably saved the infants' lives.

THE USE OF VACCINES IN DISEASES OF THE EAR, NOSE, AND THROAT.

COATES in the *Journal of the American Medical Association* of January 20, 1917, states that probably the most general adaptation of vaccines to ear, nose, and throat practice has been their use for the prophylaxis of acute rhinitis or common cold not only by the specialist, but by the general practitioner, the country over—so much so, indeed, that patients now demand the so-called serum treatment. The mere fact that it has come into such general use by physicians and the general demand by the laity would indicate at least some value in this method. Most of the immunization is, of course, necessarily done with the aid of commercial mixed vaccine of the many well-known different brands on the market. It would be manifestly impossible to culture the causative organisms for the next cold from every nose at present in healthy condition, although it is probable that in a certain proportion of cases organisms would be obtained from which competent vaccines could be made. In case the patient is sub-

ject to repeated acute colds, cultures taken during one of these may be used for vaccine preparation and prophylaxis against future ones, with most excellent results.

Taking it for granted then that the use of vaccines for the prophylaxis of acute rhinitis is of value, one would naturally ask of how much value this method is. Many cases, of course, will fail to respond, due probably to the fact that the organism causing the cold is not in the vaccine used, whether it be autogenous or commercial mixed. For it is quite possible that in taking the culture from the nose the causative organism may not be obtained. In this relation the work of G. B. Foster, recently published, in which he seems to demonstrate as an etiologic factor in acute rhinitis minute filter passers or filterable toxins, would very readily explain these failures. By accepting this work as being of great value, we must not forget that the old, well-known organisms do cause a certain percentage of rhinitides, or at least by secondary infection prolong them to their customary length, and when due to them vaccine treatment will prevent or cure a very considerable proportion.

The duration of immunity depends much, of course, on the amount of exposure, the individual peculiarities of the patient, the amount of vaccine given, and the presence of epidemics. For instance, a patient subject to acute attacks of rhinitis every few weeks may be so immunized that the interval will be stretched to six, eight, or ten weeks or longer. The individual who has one or two bad colds during the winter may be immunized so that he will go from year's end to year's end without any. These immunized patients frequently start apparently to have colds—that is, sneezing, sniffing, coryza, etc., which symptoms pass off in the course of a few minutes or a few hours. This is readily explained if we consider the probable etiology of many colds. Change in temperature of the air inspired or impinging on certain dermal surfaces excites reaction in the vasoconstrictor and vasodilator and secretory centers and corresponding relaxation of the nasal mucosa, an

increase of blood, secretion, sneezing, etc. Here it probably is that the infection takes place and prolongs the cold. If the patient is immune to infection the cold disappears with these few symptoms.

In this connection a word or two on the treatment of acute colds is appropriate. If colds are treated early, there is no doubt that a great many of them may be stopped short—that is, within twenty-four hours. But, of course, to do this an autogenous vaccine cannot be used, nor can a bacterial diagnosis, as a rule, be made on account of the shortness of the time. Acute tonsillitis is in precisely the same category. The well-known rôle that acute rhinitis in repeated attacks plays in diseases of the ear will at once convince the aural practitioner of the value of this prophylaxis. While the actual condition may or may not be improved by the vaccine, there can be no question that the lengthened interval between attacks and the diminished severity of them make it possible to obtain results in the treatment of recurrent acute catarrhal otitis media and chronic catarrhal otitis media that are not possible without some such method of treatment for the nasal condition.

THE DURATION OF PARESIS FOLLOWING TREATMENT.

In the *American Journal of Insanity* for October, 1916, DUNTON and SARGENT write on this subject and say that as a conclusion it may be stated that the duration of paresis following treatment by the Swift-Ellis method is about half that of cases treated by the older methods.

HEMATEMESIS AND ITS TREATMENT.

CROSS in the *Long Island Medical Journal* for January, 1917, gives the following advice as to the control of hematemesis:

First, there is the need of the most absolute physical and physiologic rest and quiet—accomplished by rest in bed and the free exhibition of morphine hypodermically, and the avoidance of any and all

feeding. When a feeding schedule is resumed, it must be characterized by utmost conservatism for several days.

What shall be said of the oral administration of medicaments? Such a drug of value must do one of two things: either act locally on the muscular coat of the bleeding blood-vessel, or assist directly in the formation of a clot. If the hemorrhage is small, ten to twenty drops of the usual stock 1/10-per-cent solution of adrenalin chloride is worthy of trial. The adrenalin must come directly in contact with the damaged blood-vessel and exert hemostasis before its chemical composition can be altered by the gastric ferment, as its action is limited to local effect on the muscle of the vessel walls, or possibly the nerve terminations contained therein. If the gastric enzyme has been fixed by the blood present in the stomach or the stomach comparatively empty as the result of recent vomiting, can one hope for local absorption of the adrenalin before it can be chemically changed? Granted that contact of adrenalin solution and ruptured blood-vessel is effected, one may look for physiologic action of adrenalin in lasting from one-half to two hours.

Ewald's suggestion of gastric lavage with ice water is interesting: it is at least rational, tending to cleanse the stomach and to stimulate the wall of the damaged blood vessel to contraction by the application of cold. A brave man would therefore have the logic-sustaining courage, if he used it.

What remedies have been suggested of value in assisting the formation of a clot at the bleeding point? Calcium salts, through contributing to the formation of fibrin ferment, are in this group. But given per os they are irritant and frequently provoke vomiting: given per rectum they are rarely retained long enough to be absorbed. Consequently they are not of much help in an hour of trouble. Large, but small doses of insoluble bismuth salts probably act mechanically. Ten-grain capsules of gallic acid may be well borne.

It will be interesting to note what value will be ultimately assigned the throm-

plastin suggested by Hess and tried out so successfully in the throat operations of the Children's Clinics of the New York Department of Health as reported recently by Cronin. Hess has proposed the use of its solutions intravenously in acute internal hemorrhage.

There are a number of substances which must be considered because of their tendency to limit the hemorrhage by facilitating the formation of a blood-clot when given subcutaneously. Cross refers to the group of biologic products of which horse serum is the type. This particular serum is very valuable in doses of 20 Cc. When repeated the possibility of anaphylactic phenomena supervening must be borne in mind. Coagulose, a sterile soluble powder containing fibrin ferment from the horse, is on the market commercially. Dissolved in water at 98° and injected subcutaneously in doses of one ampoule of the original preparation in 15 Cc. or half an ounce of water, a second dose can be given in one or two hours, and in persistent hematemesis a daily schedule of three or four doses can be followed for several days. Its use is very advantageous, and there is this to especially commend it—it is readily obtainable in an emergency.

Human serum or fresh human blood may be used subcutaneously without the fear of anaphylaxis, but the serum is ordinarily not at hand, save in large hospitals, and one must bear in mind in the contemplated use of fresh human blood the ever-present danger of lues.

When the hemorrhage is large or profuse, the effect of the withdrawal of such an amount of blood is to precipitate the patient into shock, with pallor of the skin and mucous membranes; cold, sweaty extremities; small, rapid, feeble pulse; and dyspnea. The indication for a supporting dose of morphine is plain; and the question of saline hypodermoclysis must be considered. There are those who raise a doubt as to its advisability, but the consensus of opinion is that it has a real value, the same value that it has in other conditions of posthemorrhagic shock. Its slow absorp-

tion, comparatively speaking, makes for restoration of blood volume without the rapid increase of blood-pressure that would favor continuance or augmentation of the hemorrhage. The Murphy drip of normal saline is of unquestioned utility, if the rate of dropping is not so great as to induce expulsion of the total amount of fluid given. This admittedly is largely a matter under nursing control. Direct transfusion of blood in this day of the simplification and perfection of the technique of this surgical measure would be of value in desperate cases, adding a factor in blood-clotting that the subcutaneous injection of saline does not present.

To recapitulate, then, the treatment of gastric hemorrhage is rest in bed with physiologic rest of the stomach, morphine hypodermically, adrenalin by mouth, the subcutaneous use of a blood-coagulating element, and treatment of incidental shock with fluids given carefully per rectum or subcutaneously. Individualization in treatment is essential.

In this none-too-satisfactory treatment we may console ourselves with the fact that the immediate mortality of hematemesis is 5 per cent or less.

THE TREATMENT OF ACUTE BACILLARY DYSENTERY.

FISHER in the *British Medical Journal* of January 13, 1917, in writing on this subject says that the aim in deciding upon a diet is to find one which will sustain the strength of the patient without leaving much residue to pass into the large bowel. In accordance with this principle, cases are only allowed albumen water, barley water, and lemon water for the first forty-eight hours. This may seem rather drastic, but he is sure it is the correct treatment. Also this period of abstinence from food combined with an aperient is generally sufficient to cure the simple gastroenteritis, and such cases can then be discharged to duty two or three days later. Coincidentally with the improvement of the general conditions of the patient with true dysentery,

his diet is gradually increased somewhat upon the following lines:

Breakfast (7 A.M.): Two or three eggs and tea.

Lunch (11 A.M.): Jelly or arrowroot and a piece of chocolate.

Dinner (1 P.M.): Beef tea and milk pudding.

Tea (4 P.M.): Custard and tea.

Supper (7 P.M.): Cocoa or biscuits.

During the night bovril or a little Horlick's malted milk.

Milk is not allowed except in the form of pudding or custard, as it is much too bulky for an acute or chronic dysentery. In addition it passes through the intestines, and by giving the stools an intense green color tends to mask their character.

Upon this diet many cases increase in weight. No further increase is allowed until the patient has been two consecutive days without passing more than two stools in any twenty-four hours, after which bread and butter is added, and chicken follows in two or three days more. It is very important that this period of abstinence be enforced in order to give the inflamed and damaged intestine time to recover.

Fisher believes that the irritation and secondary infection caused by increasing the diet too soon after cessation of acute symptoms is one of the chief causes of the cases of postdysenteric colitis which are so resistant to treatment.

The fulminating cases need further consideration. On account of the subsequent griping, beef tea, bovril, and similar tasty foods are not indicated, but stimulants may be required. Fisher has found the latter to do good, though in most text-books they are stated to be contraindicated. In these cases also the mucus may persist so long, the patient becomes so emaciated, and the bowels remain so weak and irritable, that it may be advisable, for the purpose of increasing the strength and general resisting powers of the patient, to add to the diet before all signs of active dysentery have disappeared.

In view of the frequent complaints that the constant desire to go to stool robs patients of sleep, it may seem at first sight that some theoretically sedative mixture such as bismuth or chlorodyne is indicated

in order to ease pain, diminish the diarrhea, and thus allow of sleep.

In a few of Fisher's earlier cases he adopted this line of treatment, in spite of the fact that by so doing he was locking up, in intimate contact with the bowel wall, the noxious matter and organisms which the intestine had been doing its best to expel. He found that the effect on the pain was transitory, and that what little sleep was obtained did not refresh the patient, who, on the contrary, began to complain in addition of headaches, flatulence, and a nasty taste in the mouth. He found further that the diminution of the diarrhea was only apparent for two or three days, and afterwards became as bad as, if not worse than, before, and the stools from being odorless became foul. It is to be presumed, also, that the damage to the intestinal mucosa was greater in proportion to the length of time during which this pseudosedative effect lasted.

The drugs above all others which ease pain and allow of sleep are those which aid rather than oppose the effort of nature to free the host of the poison which is invading him, or to neutralize it *in situ*.

Reliance must therefore be placed on specific treatment — namely, multivalent and antidysenteric serum. This receives material assistance from such aperients as the sulphates, castor oil, and liquid paraffin. The former in particular are said to be absorbed in the first part of the alimentary canal, and to be excreted through the mucosa of the large gut, where they exercise a marked exosmotic effect. They thus conduce to lavage from within outward of the diseased mucosa, and wash out the morbid material in the process.

Fisher's treatment has therefore been magnesium sulphate one drachm thrice a day for the first few days, and then, as the stools diminished in frequency and improved in appearance, the amount was gradually reduced. This applies to practically all cases, and seems to him of such importance that he would again emphasize the fact that these drugs instead of increasing the diarrhea diminish it, for by wash-

ing out noxious material and cleansing the bowel they get rid of much of the irritation. Larger doses than those which he has mentioned are not indicated, as they may nauseate the patient, increase his discomfort, and perhaps, by scouring too completely the intestinal wall, open the door to bacterial infection of the blood by secondary infecting organisms.

Sometimes in bad cases morphine is needed, and for very severe tenesmus a suppository of cocaine one-half grain and iodoform three grains will be found most useful. A hot-water bottle will in the early stages add to a patient's comfort. With the above medicinal treatment, combined with the requisite specific treatment, there is marked improvement in the majority of cases within forty-eight hours. For those patients, however, in whom a dry, furred tongue persists indefinitely he sometimes prescribes pure water one pint thrice a day, and so far has found this very satisfactory. Rectal lavage with 1-in-1000 solution of copper sulphate and mist. simaruba often benefit more chronic cases.

With regard to multivalent antidyenteric serum, no hard-and-fast rule can be laid down as to the quantity it may be necessary to inject. Each individual case must be judged upon its merits, with the proviso that cases coming under treatment late in the disease require larger doses than those of equal or even greater severity seen at the onset. In the more severe cases Fisher injected 80 Cc. into the flank within a few hours of admission, but he generally leaves milder ones until the following morning, and then may give 40 or 60 Cc. Some of the latter do not require serum, but he has noticed that a severe case given serum immediately after admission often recovers more rapidly than a mild one treated without it.

One large dose of serum is sufficient to cure some cases; others, though much improved, require more, and in these patients, after waiting forty-eight hours, he gives a further 60 or 80 Cc.

This amount has been sufficient to cure some very severe cases, but a few of the

worst may need a third or even a fourth dose. Some cases of the fulminating variety have been given 140 or 160 Cc. serum within twenty-four hours of admission, but in these patients the first injection should, if possible, be given intravenously, for every moment saved is of vital importance.

In the majority of patients antidyenteric serum acts like magic, but there are a very few in whom it seems only to have a slight beneficial effect. If four doses of 80 Cc. each, spread over a period of six or seven days, have not brought about the desired result, Fisher does not think further injections are indicated; consequently, he has never yet given more than 320 Cc.

As a general rule there is a distinct rise of temperature within twelve hours of the injection of the serum, and sometimes this may last forty-eight or seventy-two hours. Fisher looks upon this phenomenon as a good prognostic sign, for in all cases in which it has been marked the patients have recovered rapidly. It is on account of this reaction, which may be rather severe, that he generally allows forty-eight hours to elapse between each injection of serum.

The onset of true serum disease has been most frequent on the seventh and eighth days after the first injection. The severity of the symptoms has varied with the stock of serum in use. The patients have complained of urticarial rashes, headaches, sore throats, arthritis, and edema of the scrotum. They always have a rise of temperature, and five of them showed signs of cardiac dilatation. Those symptoms have occurred in varying degrees of severity in 70 per cent of the cases to which serum has been given.

The results obtained in the cases Fisher has treated along the lines above indicated may now be summarized. He has had altogether 456 definitely diagnosed cases. They are made up as follows:

One hundred and sixty cases between August 30 and December 31. During this period the pressure of work was so great that it was impossible to keep notes of them all, and in consequence, although an ac-

curate diagnosis of the type of dysentery present was made at the time, he is not now able to give exact figures.

Two hundred and ninety-six cases admitted from January 1 to May 31. Of these 183 were acute bacillary cases, and the remaining 113 were either chronic amebic or bacillary. In this period only one case of acute amebic dysentery was admitted.

In the first 160 cases two deaths occurred. Both patients came from Gallipoli; one, a bacillary case, died the night of admission, and the other, which was a "mixed case," died of a perforated amebic ulcer.

There were no deaths amongst the 113 chronic cases, but five were invalided to England and one to Cairo on account of persistence of symptoms. Possibly others may have been invalided from the convalescent homes to which they were sent.

THE INFLUENCE OF ANTISEPTICS ON THE ACTIVITIES OF LEUCOCYTES AND ON THE HEALING OF WOUNDS.

BOND in the *British Medical Journal* of December 23, 1916, brings before us the facts derived from a study of the movements of pigment particles when introduced experimentally into wounds in relation with the known facts about the spread of infection in the tissues and the behavior of phagocytes toward ingested organisms.

First, as regards the phagocytes, Rous and Jones showed that certain kinds of pathogenic organisms, when ingested by leucocytes, were thereby protected from the bactericidal and bacteriolytic action of antibodies present in the serum. On the death of the phagocytes, the organisms so liberated were capable of renewed growth. The same observers also found that potassium cyanide in N/150 concentration killed typhoid bacilli while free in a suspension of guinea-pig's corpuscles, without killing those cells, but that the bacilli which had been ingested by the corpuscles were protected from the action of the potassium

cyanide and grew when the emulsion was plated out. Goadby, from a bacteriological examination of sinuses and from a consideration of the action of autogenous vaccines in preventing the reinfection which so frequently occurs in sinus cases, concludes that reinfection is closely associated with phagocytic action.

Dr. Cresswell Shearer and Dr. Warren Crowe have recently shown that the meningococcus may be ingested by human leucocytes in large numbers without undergoing digestion, and they have recovered living germs from these leucocytes in a number of cases. They also bring forward evidence in favor of the view that under certain conditions the leucocytes may act as the carriers of the infection from the nasal passages to the central nervous system. The recovery of pigment-loaded leucocytes from the cerebrospinal fluid after spraying the nasal mucous surfaces with some innocuous pigment would go far to settle this problem.

Bond's own observations suggest that return-immigration of leucocytes is intimately associated with the spread of infection and recrudescence sepsis in wounds.

In the second place, the part played by the fixed tissue cells in infection is a very important one. The observations of Kyes show the important part played by the hemophagic cells of the liver and spleen in destroying pneumococci injected into the general circulation of the pigeon, and Bull, at the Rockefeller Institute, has shown that intravascularly agglutinated bacilli ingested by polymorph leucocytes are carried to the liver and spleen and ingested by the cells of those organs. In this paper Bond has described the process of ingestion by the fixed tissue cells of pigment granules carried by leucocytes and the ingestion of pigment granules brought about by phagocytes to the liver and spleen cells. The exact method by which the transference of pigment is effected, whether by internment of the leucocytes *en masse* or by a process of disengagement and reingestion, requires further elucidation. It is, however, clear that a close analogy exists between the transportation of pigment by wandering cells and the

spread of infection in wounds. The spread of infection is due to a breakdown in one or more of the factors on which phagocytosis depends. Either the wandering phagocytes do not emigrate into the invaded area in sufficient numbers, or, having emigrated, they do not ingest the organisms, or the breakdown of the defensive mechanism may occur at a later stage. The phagocytes may emigrate and successfully intern the invading organisms, but they may fail to digest them, or things may go wrong during return-immigration. The organisms may be liberated by the leucocytes while still alive, just as the pigment granules may be liberated, and they may retain sufficient virulence to originate a recrudescence in a new area. It is quite likely that some part of the autointoxication which attends the too frequent movement of infected limbs may depend on a liberation of ingested organisms brought about by injury to germ-containing leucocytes rather than to a mechanical pumping of the organisms or their toxins into the tissues.

If it be true that some part (how large a part is at present unknown) of the spread of infection in wounds is due to a breakdown in the defensive mechanism of phagocytosis, of which return-immigration is only one phase; if, in other words, a certain number of pus cells in infected wounds reënter the circulation or the tissues carrying ingested but still living organisms with them; and if a certain proportion of the latent infection in sinus cases and the recrudescence sepsis which breaks out in healed wounds is due to this same cause, then any method of wound treatment to be successful must deal with the problem of the return-immigration of germ-laden phagocytes. The subject is one, however, of great delicacy and difficulty. If antiseptic solutions when applied to wounds are sufficiently strong to kill the phagocytes and their cargoes, and so prevent their reëntrance into the tissues, they will also inhibit emigration and phagocytosis. The irrigation of a wound with normal saline favors emigration and ingestion, but it does not prevent return-immigration. The application of hypertonic

saline, on the other hand, may prevent return-immigration by killing the leucocytes, but it also checks emigration and phagocytosis.

A few experiments have been carried out to test the effect of various antiseptic agents on the capacity to ingest pigment or starch by the leucocytes and pus cells exposed to the action of such reagents when applied to wounds. The pus from a case of compound fracture of the tibia in which a cup-shaped granulating wound was dressed with the mixture of iodoform, bismuth subnitrate, and liquid paraffin known as "Bipp," to which also some sterilized rice-starch had been applied, showed that the percentage of leucocytes containing starch grains was reduced, while the proportion of starch grains free in the discharge was increased, although a considerable proportion of the pus cells from the same wound retained their vitality.

It is interesting to note that the starch grains in the pus from wounds that have been treated with the iodoform, bismuth, and paraffin paste are colorless. The grains in the interior of the phagocytes and the free grains only show the blue color characteristic of the presence of free iodine after that reagent has been added. This bears on the question of the liberation of iodine in wounds dressed with iodoform paste.

Samples of pus from wounds previously dressed with gauze soaked in Dakin's solution (Daufresne's formula) with the addition of a little rice-starch show that the inhibitory effect on the ingestive capacity of the leucocytes is less marked than in pus from wounds dressed with the iodoform paste. In one superficial granulating and healing wound, dressed twice daily with soaks of Dakin's fluid, nearly all the starch grains were ingested by the leucocytes in the fibers of the gauze dressing.

Certain facts stand out prominently in this world-wide and still unsolved problem of the routine conversion of infected into sterile wounds in war. An experiment in immunization is now being carried out in Europe on a colossal scale. The control of the virulent infection set up in wounded tissues is far and away the biggest factor

in the problem of the treatment of wounds in war. One is struck by the rapidity and efficiency of the immunizing process as carried out by nature in some cases and by the failure of it in others. The difficulty is that we cannot distinguish beforehand those cases in which it will succeed from those in which it will partly or completely fail.

DIAGNOSIS AND TREATMENT OF TRACHOMA.

In the *Medical Record* of January 6, 1917, CARHART reminds us that the treatment of trachoma is medical or surgical or both, according to the indications and type of the disease. In the children's clinics of the Bureau of Child Hygiene they are mainly interested, of course, in the medical treatment of trachoma, and he briefly mentions first the remedies which have been or are used to cure trachoma or ameliorate its symptoms. As trachoma is a purely local disease, local applications of various antiseptics or astringents have been used with varying results for many years to destroy the focus of the disease in the tissues of the lids. Among these one of the oldest remedies is the pencil of sulphate of copper, but of recent years they have found this bluestone to be apt to cause excessive cicatrization of the conjunctival surface, besides being quite painful if used at all thoroughly without the aid of cocainization. When used at all, it should be confined to the milder cases of passive papillary trachoma with small hard nodules and practically no secretion. De Schweinitz in his latest edition still mentions it favorably for selected cases. The time has gone by when hundreds of cases of trachoma were treated indiscriminately with touches of bluestone. Where used on the vascular type of follicular trachoma, it seems to aggravate the general infiltration. Recently a five-per-cent ointment of copper citrate, as originally recommended by F. R. Von Arlt, if followed by gentle but thorough massage, seems to work better than bluestone in selected cases of papillary trachoma. For the past ten years or more a solution of 1:500 or 1:300 bichloride of

mercury has been rubbed by some oculists on the conjunctival surface with an applicator, and this bichloride rubbing is said to work well when properly done. If done thoroughly, it is somewhat severe and said to need 10-per-cent cocaine instillation to allay the discomfort. Of course, it is hardly applicable in the presence of corneal involvement for fear of doing more harm than good, nor is it allowable to use so forcible rubbing as to cause bleeding from abraded surfaces to any considerable extent. This bichloride rubbing has been practically discontinued elsewhere, although used occasionally in their clinics.

Another old remedy is nitrate of silver which still works well in one-half to one or two-per-cent solutions for certain cases of follicular trachoma, but argyrosis must be avoided by using the remedy intermittently and in weak solutions wherever possible. The writer has recently seen several marked cases of staining of the fornix and conjunctival surface by prolonged use of nitrate of silver. Argyrol is a silver remedy which was supposed not to cause argyrosis, but this is not strictly true, although it is very much safer than nitrate of silver. He is personally fond of using argyrol in 25-per-cent solution in follicular trachoma with marked vascularization and considerable secretion, since he thinks its high penetrating power checks the severe symptoms, even if it does not cure the disease. Prince, of Springfield, Ill., renews the claims of sulphate of copper instilled into the eye, a most useful application in some cases. Its action seems to be similar to the old tannin and glycerin solution 30 to 60 grains to the ounce, which depended for whatever effect it might have upon its astringent qualities. Prince uses a watery solution of copper sulphate, freshly prepared daily as needed. In the later stages of follicular trachoma with large masses of vascular granulations 30- to 50-per-cent boroglyceride can be rubbed over the lids with a cotton-wrapped applicator, and this remedy does nicely to combat excessive shrinking of the conjunctival membrane and prevents to some degree the distortion

of the lid structure so common in old trachoma.

A number of other remedies have been tried with varying results by different oculists; among them are solutions of permanganate of potash (1:3000 or 1:5000 instillations and 1:500 or 1:1000 directly applied), ichthyol, itrol in powder, and iodoform or aristol in powder or salve. Electrolysis is advocated by some experts, Dr. Cleaves for instance, who claims that it increases the absorptive effect of appropriate remedies, but the writer personally has no experience with it. Radium and the x -ray have also been tried with some reported success. Recently autogenous vaccine therapy has been considered.

The writer's opinion as to medical treatment leans to the side of some ointment like the 5-per-cent copper citrate he has mentioned, well rubbed in by gentle but thorough massage either directly or through the closed lids. The choice of the remedy is not so important as its proper application by this thorough massage. The application so performed takes more time than hurried instillations of solutions or touching up with bluestone, but if we are not to sacrifice the quality of our work in the mad rush for quantity, we, far above our efficiency records for speed and swollen statistics, must consider the welfare of our patients, these helpless children.

All trachoma cases are liable to more or less severe exacerbations of symptoms of ocular discomfort, lachrymatous and mucopurulent secretion, and while these exacerbations persist, astringent, painful, or harsh remedies of any kind are distinctly not in order, as we must for the time being treat these cases very much as we do any acute conjunctivitis, that is with copious, warm boric acid cleansing, bichloride of mercury solution 1:5000 or 1:10,000, mercuric cyanide 1:1500, argyrol or protargol instillations, or other mild collyria. Our motto should be, to quote Jacobi's phrase in other matters, *non nocere* (not to harm), and the writer is sure we do very much better in vascular stages of even chronic trachoma to make haste slowly. Of course,

during these exacerbations of secretion of muco-pus, the children should be excluded from school, or treated in special ophthalmia classes, as this stage of their trachoma is violently contagious.

Dr. Wiesner has discussed so well the main complication of trachoma, namely, the corneal involvement which we call pannus, that the writer need not refer further to its treatment.

As to the surgical treatment of trachoma, all surgical procedures aim to shorten the duration of the disease by removal of the follicle-bearing tissue in the lid structure. Of these methods of treatment the old expression operation or some modification of it, if properly performed, is still exceedingly useful. Expression, grattage, and other similar methods should be limited mainly to non-vascular types of trachoma where there is little or no secretion or engorgement of the lid structure. Pronounced papillary trachoma does not usually do as well with expression as trachoma characterized by large sago-grain follicles, a type by the way which our bacteriological friends insist is not true trachoma. Trachoma complicated with either corneal involvement or pronounced vascularization is not suited to expression, but should have persistent and thorough medical treatment, followed, if at all, by a Heistrath-Kuhnt tarsal excision in competent hands. Personally, the writer believes an early Heistrath-Kuhnt operation, carefully performed at the first suspicion of corneal ulcer or pannus, will practically always prevent the development of these destructive complications of trachoma by removing their cause in the irritative pressure of the infective and rough trachoma granules, and he so advises his private patients and others whenever he notices the cornea to be involved in the slightest by either ulcer or pannus. Some years ago Dr. H. W. Wootton and the writer performed at the Manhattan Eye, Ear and Throat Hospital a number of Heistrath-Kuhnt tarsal excisions with gratifying results in relieving symptoms and hastening the cure of the trachomatous condition. About nineteen children, the first year or

two, came under his personal operative care, some of them being sent from the Children's Clinic, and all of these children were markedly benefited. At that time this operation was new in America, and Dr. Wootton and the writer were the first oculists in the eastern part of the United States to develop it, although now it is quite the routine procedure in many localities for trachoma with corneal complications. This operation acts well when properly performed because the removal of the tarsal cartilage takes away all friction and pressure on the cornea, thus relieving the eyeball of the constant irritation of the trachoma nodules. Of course, also the entire adenoid layer of the lid which bears the trachoma follicles is removed, and thus if thoroughly and properly performed the disease is radically cured by removal of its cause. The writer has said so much about this Heisrath-Kuhnt operation because he believes it is the only radical cure for trachoma with complications whenever medical treatment faithfully tried has failed in severe cases to effect a cure. Of course, it is quite an important operation and demands hospital, not clinic, facilities.

All operative measures, whether expression or radical cure, require careful after-treatment, and most of the relapses and poor results, if not due to careless operating, can be laid to insufficient or inadequate post-operative treatment.

ABUSE OF SOAP.

To the *Liverpool Medico-Chirurgical Journal* for 1916, BARENDT contributes an exhaustive article on this topic. He thinks there is no doubt that many patients are addicted at one time or another to the over-use of soap. They make a fetish of their favorite brand, and pride themselves upon their love of cleanliness; and their smug superiority to those who are not so soapy is only too patent. Even the best soap can be abused. The alkali may chip and furrow the epidermis, and produce slight scaliness over the prominences of the face and hands—regions more washed than any others.

Barendt has often seen these furfuraceous patches on the faces of members of the Medical Institution—not sufficiently serious, perhaps, to hie them to a specialist. In children they are frequent, and it is the patches due to abuse of soap which are apt to become inoculated with microorganisms and finally portray the picture of impetigo. Among the poor the household soap is used for washing the body. If the soap is what is termed a quick washer—i.e., made from copra—it requires a considerable quantity of alkali to saponify it, and consequently when used with water a corresponding amount of alkali is set free. This is probably an explanation of the number of cases of impetigo seen among hospital patients.

Nurses often use too much soap on the patients, especially when these are confined to bed. The secretion of the skin is sluggish, and the excessive removal of the natural grease leaves the skin rough and branny. As those patients who are bedridden show this state of skin most frequently, it has been described as pityriasis tabescentium by authors of old medical works.

Surgeons before they adopted gloves for operations, with their well-known zeal for cleanliness, constantly used too much soap and their hands suffered. The skin was scabrous, red, and undoubtedly invited dissemination of microorganisms. Their surgical forefathers laid great stress on the cleaning of the skin. Old books on surgery constantly speak of "mundifying the region," and "when thorough mundification has taken place." But they were careful not to be too vigorous, as some modern surgeons would appear to be, in mundification. More than once Barendt has seen untoward effects, pruritus and redness, resulting from too much soap being used at the site of operation, and the surgeon querying in his mind whether it is erysipelas that has supervened.

Many patients suffering from pruritus without any apparent cause will be found to be using too much soap. Bath pruritus is really due to the action of the alkali on an overwashed skin; itching around the or-

fices is constantly aggravated, and perhaps more often fretted into existence than most medical men think, by abuse of soap. The delicate skin of new-born babes has been irritated through the mistaken zeal of the nurse in oversoaping to remove the vernix caseosa. The intertrigo of the napkin area in infants is frequently caused by abuse of soap. Frictional eczemas are invariably aggravated by soap and water. A moment's consideration explains the situation. Soap is brought into contact no longer with the external layers of epidermis, but with the delicate deeper layers never intended to be exposed to external influences. Soap acts as a foreign body to the skin, and as such must be kept away if further injury is to be prevented.

TREATMENT OF PLACENTA PREVIA.

HELLIER in the *Practitioner* for January, 1917, does not suggest that every case of placenta previa should be treated by Cæsarian section, but he does say that, when once the malposition of the placenta has been diagnosed, when the patient is not in labor or is only just beginning, and when the genital canal has not been infected, the treatment by Cæsarian section, in the hands of a man accustomed to abdominal work, and under those conditions now at our command in almost every town having a surgical clinic, is a very excellent method of dealing with one of the most serious emergencies which the accoucheur is called upon to face.

CLINICAL CONDITIONS WHICH MAY BE ACCOMPANIED BY ACIDOSIS, WITH THEIR TREATMENT.

Writing in the *American Journal of Obstetrics and Diseases of Women and Children* for January, 1917, PEASE recalls the fact that an acidosis may be produced in three ways: (1) By the introduction of acids from the outside, as for instance through the alimentary tract; (2) by a failure in the excretory organs so that acids which are normally excreted are gradually accumulated in the blood stream; and (3)

an insufficient amount of alkali in the organism, perhaps as the result of abnormal loss of bases.

Probably the most common clinical condition in children which may be accompanied by acidosis is so-called food intoxication.

The symptoms of acidosis are first restlessness and sleeplessness, which gradually change to somnolence and finally to coma. Inspiration and expiration become more and more exaggerated, in order to increase the ventilation of the lungs, and finally develop into dyspnea of the "air hunger" type. There may be a small amount of sugar in the urine. Prostration is severe and there is evidence of an enormous loss of fluids. The death-rate has been in the neighborhood of 80 per cent. The amount of actual diarrhea present bears no constant relation to the degree of acidosis. A prominent symptom of the onset is the severe vomiting, which ceases as the child passes into coma, and may or may not return as recovery takes place. Clinically the relation between this type of diarrhea and milk can be clearly traced, and the suspicion that the milk was stale is highly probable. A complete elimination of milk from the diet for days offers the most hope of ultimate recovery. The nourishment is supplied by the use of thick gruels and solutions of glucose. If conditions are not too desperate a period of starvation of twenty-four to twenty-eight hours would as a rule see the end of the acidosis, which might recur if even a small amount of milk was given. In connection with the suggestion that milk might be a cause of acidosis, it may be observed that a large majority of cases occur during the summer months, and especially during particularly hot weather. High fat and sugar feeding result in diarrhea, but such diarrhea is not in any circumstances accompanied by acidosis, though they do make the child more susceptible to the conditions which result in acidosis. It is a question that has not yet been satisfactorily answered if this type of acidosis is not in reality a form of acute proteid indigestion, since with the high proteid feeding of the present

day proteolytic processes become most prominent in the intestinal tract.

Closely related to the form of acidosis which accompanies the above type of diarrhea is recurrent cyclic vomiting. While acetonuria appears very promptly in recurrent or cyclic vomiting, not all of the cases exhibit definite symptoms of acidosis, in part probably the result of rapid compensatory excretion of acids and in part perhaps due to the vomiting itself. A period of starvation is likewise indicated in acidosis of this nature. A matter which has not received the attention it deserves, both in recurrent vomiting and ileocolitis with acidosis, is the frequent appearance of very large amounts of indican in the urine. This is often a transient finding which disappears, particularly if there has been vigorous treatment. A carbohydrate peak in the food does not seem to suggest itself as an etiological factor in either of these conditions. There are other less frequent conditions occurring in children which may be accompanied by acidosis, as diabetes and acute nephritis. In both the acidosis does not often manifest itself except as a terminal condition. Pneumonia is accompanied by a reduction in the carbon dioxide content of the blood, but the facts seem to have little if any relation to the severity or duration of the disease. This is a point that is worthy of further and more extended observation. The acetonuria which frequently follows anesthesia rarely results in a disturbance of respiration or in a lowered carbon dioxide tension, if Pease's limited experience may be considered as any criterion. Extensive burns sometimes result in acidosis.

The treatment of acidosis should be first a period of starvation, and then the return to food should be to carbohydrate and the vegetable proteids, milk and broths being added very slowly and cautiously. The acidosis itself must be handled by neutralizing the acids. Sodium bicarbonate may be given by mouth, per rectum, intravenously, and under the skin, in an amount sufficient to render the urine alkaline in reaction. If given under the skin the sodium

bicarbonate must be specially prepared. The solution may be sterilized, and when cold carbon dioxide bubbled through it until the phenolphthalein which has been added is colorless. The solution for intravenous injection should be of 4-per-cent strength and from 75 to 100 Cc. should be given, according to the size of the child. By mouth from 10 to 15 grains of sodium bicarbonate may be given every three hours.

ACUTE CARDIAC FAILURE: TREATMENT BY INTRAVENOUS INJECTION OF STROPHANTHIN.

In the *Liverpool Medico-Chirurgical Journal* for 1916, HAY in a paper on this subject reaches these conclusions:

1. Acute cardiac failure is due in very many cases to the onset of auricular fibrillation in hearts already handicapped by disease.
 2. It has been proved that of all drugs the digitalis group is the most potent in steadying such hearts.
 3. The onset of the cardiac failure is sometimes so sudden and the downward progress so rapid that oral medication may prove too slow to be of any service.
 4. Again, at times the patient's stomach will not tolerate any member of the digitalis group; a vicious circle is set up which ends in the death of the patient.
 5. In such cases strophanthin injected into a vein produces immediate definite slowing of the heart and rapid amelioration of the patient's condition, and without doubt has saved many lives.
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THE USES AND ABUSES OF PITUITRIN

RAWLS in the *Virginia Medical Sem. Monthly* of February 9, 1916, reiterates the statement that the chief use of pituitrin is to stimulate uterine contractions in cases of inertia, in which there is no mechanical obstruction to delivery. When it is first given there are from one to three prolonged contractions. In the multipara with the cervix completely dilated the delivery is often accomplished during these

pains; if not, the uterus settles down into regular, rhythmical contractions, which are the exact counterpart of a normal labor except that they are harder and more prolonged.

It is claimed that it will not induce uterine contractions *per se*, but Rawls has had several cases in which the patient was at term, or beyond, or in which the uterus from other reasons was ready to empty itself, in which a tube of pituitrin apparently produced the stimulus for uterine contractions. He cites two instances:

He was called one evening at 6 P.M. to see a multipara who, according to her account, was ten days overdue. She stated that she had no symptoms whatever of a labor, and simply wished to know wherein she had missed her count. An examination revealed an almost completely dilated cervix, with the vertex engaged in the superior strait. She was ordered to remain in bed until Rawls' return. When he came back two hours later he found her very much disgusted with the entire proceeding. She looked upon the whole thing as a joke, and stated that she never felt less like being in labor in her life. At 9 P.M. she was given one tube of pituitrin, and in a few minutes regular, rhythmical contractions set in and the baby was delivered at 9.50.

In the second case Rawls had tried to induce labor at eight and one-half months for an intense headache that not even morphine would relieve. He first introduced a thirty French catheter well into the cervix; at the end of thirty-six hours it was removed, the patient having had no pains, and but very little dilatation, with some general softening of the cervix. At this time one-half a tube of pituitrin was given, which caused some ten or twelve pains. Two days later, at 4 P.M., a large size conical bag was introduced into the cervix and distended with sterile water. It came away at one o'clock that night without any pains. The next night she was given another half tube of pituitrin; severe pains were immediately induced, and the delivery was accomplished in an hour.

The action of pituitrin lasts from forty-

five minutes to one hour and a half, and no patient should be left for an hour and a half after a dose has been given. If delivery does not occur in an hour after the administration of pituitrin it is his custom to administer a second dose just after the delivery of the child as a prophylactic against postpartum hemorrhage, for the uterus, worn out by its first efforts, will not contract after the expulsion of the placenta; and even this should be further fortified by ergot. The action of pituitrin is fleeting, that of ergot more prolonged. Pituitrin should not be given unless chloroform is in immediate command to mitigate unexpected violence of action. In cases in which it is given for uterine inertia before the cervix has been completely dilated, the initial dose should certainly not be more than .5 of a Cc.

He has been accustomed to administer a dose of pituitrin immediately following curettement for incomplete abortion, but recently he read an article by Furniss, of New York, stating that he gave 1 Cc. of pituitrin fifteen minutes before starting his curettement, claiming that there was less uterine surface to curette, less likelihood of perforation, and less danger of immediate and subsequent hemorrhage. It seems almost unnecessary to caution against its use in primiparæ whose pelvic measurements are not definitely known; in the early stage of labor without a well-dilated or easily dilatable cervix; with the presenting part not engaged or, if engaged, in a malposition; or any other form of mechanical obstruction to a natural delivery; or to cater to the inclinations of the obstetrician to hurry his case; yet the increasing number of ruptured uteri would certainly indicate that there are some who do not thoroughly recognize the contraindications to pituitrin.

Next to its use in obstetrics, the most common use of pituitrin is following operations. It is probably the best intestinal stimulant that we have. The writer has come to rely upon it in those cases of distention following abdominal operation, and orders it as a routine in cases in which a

large amount of handling of the abdominal viscera is unavoidable. He usually gives one tube every four to six hours in these cases, beginning before the patient leaves the table. It has a further use in surgical cases complicated with retention of urine, and no case should be catheterized until pituitrin has been tried. He has found it of wonderful benefit in cases of shock, and places it third only to morphine and hot saline in his treatment of that dread condition. A third use of pituitrin, not so well known as the first two, is its action on hemorrhage. He doubts if it is a styptic in itself; it probably acts on muscular tissue, contracting the arterioles. He orders it as a routine in tonsillectomies and circumcisions in babies who show a tendency to ooze. He has seen it stop very persistent nosebleeds in a short time after administration.

STRABISMUS AND ITS TREATMENT.

In the *Albany Medical Annals* for February, 1917, STAPLETON reminds us that the treatment of squint may be non-operative or operative, depending upon the kind of squint, age of the patient, etc.

If a squint is noticed in a child by the family physician, he should not advise the parents that the eye will in all probability straighten up all right, or that the child will grow out of it. Perhaps the eye may straighten, but usually one will find that the eye which had deviated is partly blind, a condition which probably could have been averted if the child had been treated when first noticed.

The treatment in youngsters consists in refracting carefully under atropine and prescribing the proper correction. This can be done in children as early as a year old. The atropine is usually continued in the fixing eye for some weeks, allowing the deviating eye to return to normal and making it do the work, thus developing the retinal function.

Worth's amblyscope is used for the education of the fusion faculty, also the stereoscope.

Men differ as to the right time for operating. Some say that operation can be performed as early as five, others that the best time is around nine years of age, while in Vienna clinics they prefer to operate after the fourteenth year.

Some operators prefer doing a simple tenotomy, others the advancement, while others choose to combine the above two. In doing in some cases a partial or total tenotomy of the muscle that is deviating the eye from the normal axis. At present the advancement operation is the most used, and operators feel that they can control the results better.

AFTER-TREATMENT OF ANTERIOR POLIOMYELITIS.

In the *New York Medical Journal* of February 10, 1917, FRAUENTHAL in writing on this subject says that treatment has a more hopeful outlook when we realize that less than ten per cent of the muscles are totally paralyzed and more than ninety per cent are simply parietic.

One should always carry in his mind the physiological effect of heat, hydrotherapeutics, massage, electricity, and muscle education (as herein described, performed before a mirror) in the treatment of cases of infantile paralysis.

The following salient points are worthy of repetition owing to their importance in treatment:

1. It is advisable to give all treatment early in the morning, the child being then in the best physical condition and having expended little of his recruited strength, which makes a good standard of comparison. The apparent condition of the child is to be noted as a basis to determine the amount of treatment to be given on that particular day.

2. Heating should be carried on to warm the muscle tissue, but not to manifest a perspiration that would be a physical tax. The warming of the skin requires less electrical current for reaction.

3. Massage should be given as a mild stimulant to the muscle and circulation, but

not to exhaust the muscle tissue or to produce pain or irritation of the child.

4. In the administration of electricity, no matter what current is used, it should not be strong enough to give the child pain or act as an irritant. The least possible amount of current that will produce a contraction should be used, and not to a point of exhausting the muscle or until it ceases to contract.

5. In muscle education the exercises should be limited to a time that will not overtax the paretic muscle.

6. In the use of the bath, care should be taken not to have the heat of the water so high as to irritate the skin or to burn it.

7. The very best results, in Frauenthal's opinion, are obtained by administering treatment every other day, allowing the time intervening to recruit the muscle and the general health.

DIAGNOSIS AND TREATMENT OF GASTRIC AND DUODENAL ULCER.

In the *New York Medical Journal* of February 3, 1917, EINHORN asserts that peptic ulcer, as a general rule, should be treated medically. An ulcer, in itself, is not an indication for operation; in a great many ulcers—four-fifths or more—the patients improve sufficiently with medical treatment to attend to their daily work. An operation is always accompanied by some danger, and it is most inadvisable to undergo one unless absolutely necessary. First let us follow the easier plan and see if we cannot help these patients medically.

Not every patient with peptic ulcer shows the same degree of suffering. In consequence the treatment can be arranged accordingly; treatment may be adapted to the mild cases and to those cases showing severe symptoms. It is not necessary to arrange it that way, but it may be done so with advantage. The patient with mild symptoms may say he cannot stay in bed for, say, two weeks, that his business will suffer. He will ask if you cannot advise some other line of treatment. If you say no, he will go away and do nothing. A good plan is

to prescribe ambulatory treatment for mild cases, giving them large doses of bismuth with magnesia, restricting meat, but allowing plenty of butter, milk, eggs, and a small amount of chicken. Let them eat frequently and rest as much as possible, lying down for half an hour before meals. For pain give them an opiate, or, still better, atropine. There is no harm in such treatment. If the patient feels better and loses his pain, he can go about his affairs and get rid of his ulcer. He may improve to such a state that he is not suffering and may continue so for a long time. If he needs further treatment the above procedure can be repeated. There is nothing wrong in advocating such palliative treatment, because we must help the patient. In employing the ambulatory treatment it is well not to put the patient on too rigid a diet. He must have sufficient food to keep up his strength. When the symptoms are of a severe type, the best plan is to put the patient in bed.

Cruveilhier was the first to suggest milk as a diet in gastric ulcer, and the same diet has been adopted in practice by von Leube and Ziemssen and others. If the patient is in bed keep him on a liquid diet. The point is mainly to give the organ rest. As soon as the patient begins to improve, he should be given more food. He should be given bismuth, and hot applications should be made to the stomach. Then, as he improves further, the diet should be increased by the addition of eggs, cereals, and meat. The milk diet has been overdone. Many physicians think that a patient with ulcer of the stomach must live a year or more on a milk diet. The writer does not agree with them. For a short time a strict liquid diet may be employed, even if it be insufficient; but for a long period one kind of food always causes some deficiency and the patient usually suffers.

A few words about the Lenhartz diet: Lenhartz was of the opinion that in ulcer of the stomach much liquid should not be given, because it distends the stomach. He thought it essential to give a concentrated diet comprising meat and eggs. According

to the writer's experience it is well to give milk before eggs, but not to extend the rest diet for too long a time.

In dealing with active hemorrhage complete rest is of importance. The stomach should be quite inactive until the bleeding stops. Here rectal feeding is in place. Very often we find that rectal enemas irritate the bowel and also the stomach, causing vomiting. The writer had a woman patient in whom any injection into the bowel caused hemorrhage from the stomach. There was a large hemorrhage following some manipulation of the rectum. He found her pulseless, and he thought she would die. In such an acute condition it is not so much the matter of food but of water in the system which should have our attention. Water infusion is sometimes good. Here we must also resort to remedies that have the effect of checking the hemorrhage. Serum is used a great deal; emetine has some effect; adrenalin is also used. Sometimes these remedies must be combined. Opium and belladonna are of importance in checking peristalsis.

The writer has recently used the duodenal tube in cases of chronic ulcer and acute hemorrhage. The tube does no harm and affords a means of feeding the patient, at the same time keeping the affected area at rest. In a patient with severe hemorrhages, especially a patient in whom rectal irrigation cannot be performed, this is a great boon. In the patient just mentioned the writer introduced the tube at about noontime and then aspirated and got black material. We must aspirate gently. He kept the patient on ice water. The next morning he found that the tube was in the duodenum. He aspirated and got pure bile from the duodenum. He then began with the feeding, and the patient, who had had no food for about six days, could now be given milk and raw eggs. She has had no pain during a period of two weeks' duodenal feeding, and is now up and is getting well.

Duodenal alimentation can be practiced not only in the presence of severe hemorrhages, but also in a chronic case when

other remedies fail. The rest treatment plays the most important part in the recuperation of the patient. We know of nothing better than to take the food away from the affected area. No matter what the diet may be, any food must ordinarily go through the ulcerated area. If we introduce the tube and let the food go into the duodenum, skipping the diseased area, healing is promoted. It is the most rational method we have at our command in the healing process of an ulcer.

There are three physicians, Dr. N. de Rosas, Dr. Ruiloba, and Dr. Cabrero Sanavedra, who have succeeded in curing a perforated gastric ulcer by the method of duodenal alimentation. All three live in Havana, Cuba, and Dr. de Rosas has written to the writer about their patient, a case of gastric ulcer with hemorrhage and perforation. In this case a laparotomy had been done for a subphrenic abscess, and it was noticed that when the patient drank milk it came out through the laparotomy wound. Dr. de Rosas applied duodenal alimentation, and in feeding the patient through the tube no milk escaped. In three weeks of duodenal alimentation the wound healed and the patient recovered. The case was so desperate that the patient would have died. The writer has never seen a case of perforation treated in that way, but has usually seen them operated. He thinks that this method of treatment is of greater importance in duodenal ulcer than in gastric ulcer.

Regarding the surgical treatment the following indications can be given: First, if the diagnosis of perforated ulcer of the stomach, duodenum, or other location of the digestive tract be made, the patient should be operated upon, and the quicker the better; second, in obstruction of the pylorus of a high degree the best results are by surgery; in the third place, acute hemorrhage requires no surgery at the time of the bleeding. In recurrent hemorrhages we can do a prophylactic operation in the interval to prevent renewal of hemorrhage. In frequent small hemorrhages surgery is indicated very often, but not always. When-

ever we are in doubt whether or not there is malignant development, the writer usually advises operation in order to give the patient a chance of recovery in case the condition is malignant. These are, on the whole, the most typical indications for gastric surgery.

There is also another possible situation in which operation is feasible, and that is when we do all we can and cannot get rid of the pains which the patient suffers. We try one plan of treatment and another, and still the patient persists in showing unabated symptoms. Here again surgery can be resorted to. The writer cannot say that operation will free the patient of symptoms. He can advise trying it, although the results are not always successful.

SALICYLATE IN THE BLOOD AND JOINT FLUID OF INDIVIDUALS RECEIVING FULL THERAPEUTIC DOSES OF THE DRUG.

SCOTT, THOBURN, and HANZLIK in the *Journal of Pharmacology and Experimental Therapeutics* for January, 1917, point out that it has been claimed (notably by Binz, Feri, and others) that the action of salicylates in rheumatic fever is due to the liberation of free salicylic acid by carbon dioxide whose tension in the blood and other fluids is considered to be high enough for this in fever. Scott, Thoburn, and Hanzlik have tested this by direct extraction of freshly obtained specimens of joint fluid (from individuals suffering with rheumatic fever and receiving full therapeutic doses of salicylate) with ether, acetic ether, and chloroform, and then applying the ferric alum test to the ethereal extracts. By this method they have not been able to demonstrate the presence of free salicylic acid in all the fluids thus far examined (from ten patients).

The ferric alum test is sensitive to about 1:1,000,000 of salicylic acid in 25 Cc. (0.000025 gm.) of solution. It is true that the total volume of synovial fluid obtained in each case was less than 25 Cc., but it must also be noted that in the smallest

quantity of fluid (7 Cc.) there was about 32 times (0.0008 gramme) and in the largest quantity (20 Cc.) there was about 140 times (0.0035 gramme) as much total salicylate as the lowest limit of the test which permits the recognition of salicylic acid. In other words, there was considerable salicylate present, but not in the form of free salicylic acid. Any undetected free salicylic acid which might have been present could not be ascribed an important rôle as germicide or antiseptic if it is remembered that about 0.04 to 0.1 per cent is necessary to inhibit the activity of enzymes, and somewhat higher concentrations (0.15 per cent) to prevent the growth of, and about 0.35 per cent to kill, bacteria. Objection might be raised to the method used because of the possibility that some CO₂ is lost when the fluid is exposed to the atmosphere, but this is to a considerable extent prevented by the presence of "buffer" or protective substances.

The symptoms of "toxicity"—deafness and ringing in the ears, nausea and vomiting—produced by salicylate have been attributed by some to acidosis; that is, they are said to be due to or associated with acidity of the body fluids. This is the reason why sodium bicarbonate is commonly administered together with salicylate—i.e., to prevent the occurrence of acidosis. It is hardly conceivable that the true reaction (hydrogen ion concentration) of the blood could be sufficiently altered by salicylate so as to cause real acidity. The same might be said of the mechanism which maintains the reaction constant. However, this was tested out by observing the reaction and alkali reserve of the blood of individuals before and after the administration of full therapeutic doses of sodium salicylate up to "toxicity." The reaction was estimated by the phenolsulphonephthalein dialysis method of Levy, Rowntree, and Marriott, and alkali reserve by the method of Marriott. The results show no noteworthy changes in the reaction and reserve alkalinity of the blood.

The same was found to be true of the blood of animals (cats and dogs) treated

with the same doses, and in some cases even larger doses, of salicylate per kilo. The same methods were used and in some of the animals the blood was observed over long periods of time (three to nine days) after the administration of salicylate was stopped.

These observers therefore conclude that:

1. The percentage concentration of salicylate in the blood and joint fluid of rheumatic individuals receiving full therapeutic doses of the drug is approximately the same.
2. The concentration of salicylate tends to be less in the blood of rheumatic than non-rheumatic individuals.
3. There is no demonstrable free salicylic acid in the joint fluid of individuals suffering with rheumatic fever.
4. The true reaction and the reserve alkalinity of the blood are not perceptibly altered by the administration of salicylate even in large doses.

THE TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM WITH INTRASPINAL INJECTIONS OF SERUM.

WOLFSOHN in the *American Journal of the Medical Sciences* for February, 1917, states that the facts of greatest interest to the neurologist in connection with the intraspinal mercurialized serum treatment are:

1. There is no danger in its administration.
2. For local treatment it is very efficacious in syphilis of the central nervous system, especially in the treatment of tabes dorsalis, in which lancinating pains are the predominant symptom.
3. Due to its stability the serum may be used at any time after its preparation.
4. The lack of expensive drugs used in its preparation makes it invaluable at this time.
5. There is no objection to a combined salvarsanized and mercurialized treatment.
6. It must not be concluded from the short space of time (eight months) that has elapsed since the beginning of this form

of treatment in these cases that relief is going to be permanent. One will have to be cautious about prognosticating a cure until the proper length of time elapses, *e.g.* at least three years. From the results obtained so far it certainly has mitigated the symptom of pain.

THE DRUG TREATMENT OF MORPHINISM.

CARLISLE in the *Boston Medical and Surgical Journal* of February 8, 1917, states that the various forms of treatment, all of which have their adherents, may be grouped under three headings: gradual, rapid, and immediate withdrawal. His present method is that of rapid withdrawal, and it may for convenience be divided into two periods: first, that of withdrawal, and second, convalescence.

His routine is as follows: A mixture containing scopolamine hydrobromide gr. 1/150 and morphine hydrobromide gr. 1/6 is given hypodermically on the evening of the day of arrival, and repeated at intervals of six hours during the first twenty-four hours. The early effects of scopolamine usually make their appearance during this period and are manifested by marked dryness of the throat, with difficulty in swallowing; dilated pupils with blurred vision; the speech becomes difficult and rather jerky. The patient may now, or perhaps not until the following day, become mildly hallucinated (visual and auditory). In conversation his sentences are apt to be short, sharp, and often incomplete, due no doubt to flight of ideas and lack of hallucinatory control.

On the second day the intervals for injection are increased to eight, and on the third day to twelve hours. In typical cases the depressant effect of the drug (scopolamine) presents itself at about this time, continuing as a rule to some degree through the third and fourth days. This stage is characterized by a sensation of great fatigue and drowsiness; the excitement is greatly reduced and the patient seeks his bed and should obtain sleep of from four to eight hours' duration.

On the fourth day there may be some nervousness and gastric disturbance, but usually no craving for morphine. At bedtime the final dose of the scopolamine-morphine mixture is given, together with fifteen grains of trional. This is almost invariably followed by a comfortable night's sleep, lasting from six to eight hours.

Active purgation is obtained during the withdrawal period, through the liberal use of compound cathartic pills, cascara sagrada, and salines. It is of vital importance that the bowels should be made to act thoroughly each day in order to rid the system of morphine and its by-products, but the drastic catharsis recommended by some authorities does not in his experience appear necessary.

He frequently encounters individuals who fail to respond to the usual physiological effects of scopolamine, and is then obliged to modify his treatment, increasing or decreasing the rapidity with which the injections are made. It often occurs that through an apparent immunity on the part of the individual the intervals must be reduced to two or three hours until full response to it is obtained, then lengthening the interval as the case may require. About two per cent of Carlisle's cases show an idiosyncrasy to scopolamine, which makes it necessary to discontinue its use and resort to treatment by gradual reduction. These show little more than exaggerated throat symptoms and dilatation of the pupils, are exceedingly uncomfortable, and are never able to progress as far in their treatment as the depressed phase.

On the whole he is, in the majority of instances, enabled to remove the morphine from the addict's system with reasonable comfort in a period of about four days, leaving him in fair general condition. At this time what may be termed convalescence begins.

There is no specific treatment for morphinism, and no treatment, whatever the procedure adopted, can be successful in its results unless it is followed by a prolonged period of convalescence. Carlisle wishes to lay special emphasis upon this point. Many

forms of treatment, having much to recommend them in other respects, fail through the neglect of this important detail.

Immediately after withdrawal of morphine, and for a period of several weeks, the individual is nervous, troubled with insomnia, and in a condition wherein he is torn between conflicting emotions; he is impulsive, lacks self-control, and if not restrained may suddenly disappear. For these reasons Carlisle insists upon a ward residence of from one to two weeks.

Improvement in general bodily health is from now on surprisingly rapid, and in a few weeks under tonic treatment, regulated daily routine, proper diet, and out-of-door exercise, the insomnia, which is often troublesome during early convalescence, rapidly improves, and the patient appears and acts more like a normal individual. He is now given the opportunity and assistance to build up his resistive powers, strengthen his will and self-control, and readjust his mental attitude toward the use of drugs. A spirit of coöperation should exist between himself and his adviser, who should have his entire confidence.

Following a residence of from six to twelve weeks the individual may now leave the hospital with some assurance of success.

THE TREATMENT OF ACUTE POLIO-MYELITIS.

In the *American Journal of the Medical Sciences* for February, 1917, LE BOUTILLIER points out that while many drugs have been advocated and used there seems to be none which give marked results. Hexamethylenamin was used in all cases during the first two and a half months of the epidemic without apparent result, and was then discontinued. Tincture of nux vomica was used in many cases after the first week for its general tonic action without any bad effect, while in some cases the general condition of the patient improved. During the third and fourth week syrup of iodide of iron was used in a number of anemic children, with good result.

Lumbar puncture as a therapeutic meas-

ure must not be overlooked, as it is the one procedure from which is derived the greatest benefit. It should be done as often as the condition of the patient indicates; that is to say, from every twelve to every twenty-four hours in some cases; every three or four days in others, or only when increased pain and restlessness or irritability point to pressure by an increased amount of spinal fluid. By removing the pressure upon the congested portions of the cord this writer has seen cases recover from an apparent absolute paralysis of one or more extremities, which, of course, means there was only congestion and that the disease had not attacked or destroyed the nerve tracts. In other cases almost instant relief of pain followed lumbar puncture.

Adrenalin chloride in 1-to-1000 solution given intraspinally theoretically should be of great value because of its action upon the congested blood-vessels of the membranes and cord. Its use in doses of from 1 to 2 Cc. every six hours for several days has been advocated. This, however, Le Boutillier found caused marked disturbance, with vomiting in many cases, and every twelve to twenty-four hours was substituted. The results obtained were rather questionable, as it seemed impossible for the solution to reach the upper part of the cord if the seat of the lesion was high, even with the buttocks well elevated. This method of treatment, however, should not be given up until one showing decidedly better effect be discovered.

Normal human serum—that is, serum collected from healthy adults—was used in a few cases, but without result.

Immune serum, or that obtained from the blood of persons having suffered from acute poliomyelitis some months or years before, was used to as great an extent as possible. He was, however, handicapped by the comparatively small amount available, and by the fact that at first it was reserved for use in only the most desperate cases. Later on it was given to patients entering on the first or second day of the acute paralytic stage, and here some good resulted. It was given in doses ranging

from 5 to 15 or even 30 Cc., either intraspinally, intravenously, or intramuscularly, daily or every two or three days, for several doses. At times a combination of adrenalin chloride in the morning and immune serum at night was used on consecutive days, with apparently better results than when given alone. In at least two very severe cases with chest involvement the improvement following this method of treatment was most marked. When, however, a severe toxemia is present, showing a marked general involvement, the intravenous use of the serum is especially indicated. When paralysis alone occurs the intraspinal method of administration seems to be most effective. The intramuscular method, he believes, should only be employed when it is impossible to give the serum into a vein, as the absorption is much slower. Another method of procedure when the toxemia is marked is the intravenous use of hypertonic salt solution, following the removal of an equal or smaller quantity of blood; the quantity removed varying from 5 to 30 Cc., depending upon the age and condition of the patient.

THE THERAPEUTICS OF OLIVE OIL.

In the *New York Medical Journal* of February 3, 1917, ASNIS claims that olive oil not only reduces the acid content and overcomes pylorospasm, but in addition possesses decided advantages over silver nitrate, belladonna, bismuth, etc. Its action is local and not general as in the case of belladonna, nor does it tend to constipate like bismuth salts, nor does it threaten with unpleasant sequelæ as in the prolonged use of silver nitrate.

It is well to bear in mind the action of a fissure or an acute ulcer of the stomach upon the glandular structure and the pyloric sphincter, and the reaction of the pylorus and the hyperacid gastric juice upon the ulcer. The ulcer is kept active by the hyperacid juice and the spasmodic contraction of the pylorus, which in turn are kept active by the irritation of the ulcer.

Olive oil not only inhibits the gastric

secretion, but also relieves pylorospasm, and incidentally acts as a protective covering over the injured mucous membrane.

The action of the oil is also enhanced, inasmuch as it remains in the stomach for a longer period than any other drug. As already mentioned, its laxative and nutrient properties become valuable in instances where such results are most desirable.

While olive oil is equally as efficient if not superior to any other form of medical treatment in the diseases mentioned, it is, however, contraindicated in other diseases of the stomach, such as dilatations, sub-acidity, and achylia.

STUDIES OF EYE-GROUND CHANGES IN CEREBRAL SPASTIC PARALYSIS.

KEARNEY in the *New York Medical Journal* of February 3, 1917, states that every child whose delivery has been difficult or instrumental should have its eye grounds examined by competent observers directly following its birth, whether convulsions occur or not. If pressure signs are determined in the fundus of the eye and confirmed by the measurement of the cerebrospinal fluid on lumbar puncture, a decompression operation removing the hemorrhagic clot as soon as possible would greatly lessen the lamentable condition which results from neglect of this procedure.

A CONTRIBUTION TO THE PHARMACOLOGY OF STOVAINE.

In the *Journal of Pharmacology and Experimental Therapeutics* for January, 1917, H. I. SMITH reaches these conclusions:

1. Their experiments afford no evidence that stovaine exerts any direct action on the blood-vessels after the intravenous injection in cats, and it failed to change the caliber of the renal vessels of the cat or dog when perfused in concentrations of 1:10,000 to 1:2500. It depresses the heart when toxic doses are injected intravenously, and when the rabbit's heart is per-

fused with a solution containing 1 part of the drug in 10,000 parts of Locke's solution.

2. Stovaine causes death by inducing immediate and simultaneous paralysis of the heart and respiration, the action on each being independent of that on the other.

3. Stovaine disappears rapidly from the blood stream after its intravenous injection.

4. Little, or none, of the drug is excreted unchanged in the urine of the cat.

5. Stovaine is removed from perfused fluid by the liver, in which it appears to be destroyed.

6. The fatal dose of stovaine for the cat or rabbit is about 30 mgm. per kilogramme when a solution of 1:100 is injected rapidly into a vein. Somewhat more is required when dilute solutions are used. Complete recovery follows the injection of a toxic, but not fatal, dose within a short time, and several times as much as a single fatal dose may be administered within a few hours if small portions be given at short intervals. Very large doses are required by subcutaneous injection to cause death.

7. Stovaine is slightly, but distinctly, more toxic than novocaine by similar modes of administration, and complete recovery does not follow the administration of toxic doses of stovaine so promptly as it does that of corresponding doses of novocaine.

THE TREATMENT OF DELIRIUM TREMENS.

LIND in the *New York Medical Journal* of February 3, 1917, points out that in delirium tremens we have an acutely excited patient who is suffering from exhaustion and toxemia. We have then three things to treat: the excitement, the exhaustion, and the toxemia. This is done by sedatives, overfeeding, and elimination.

It is extremely important to have a trained nurse constantly in attendance who is experienced in such cases, and is tactful in dealing with the patient's whims and in persuading him to take nourishment and medication. When the patient comes under treatment stop the alcohol entirely and give four compound cathartic pills. These are

not repeated, but a Seidlitz powder is given every morning until the patient is convalescent. Hydrotherapy is triply effective: it subdues the excitement, relieves the exhaustion, and promotes elimination. Give a hot-air bath until the patient perspires freely, then place him in a hot pack. This is given by wrapping him completely except the head in sheets which have been wrung out in water at 105° F. Over these are wrapped blankets, which are pinned tightly, and an ice-cap is applied to the head. The patient remains in this pack from half an hour to an hour, is then taken out, and given a brisk rubbing with a dry towel. These packs may be repeated several times during the day. At about six in the evening of the first day of treatment the following prescription is given:

Veronal,
Sulfonal,
Trional, ää gr. v.

M. et ft. chart. No. 1. Sig.: To be taken in half a glass of warm milk.

At 7 P.M. he is put in a warm bath, where he remains until 9. At 8 P.M., while in the bath, he is given one tablespoonful of the following prescription:

Paraldehydi,
Glycerini,
Spiritus aurantii compositi, ää fl.3iv;
Aqua, q. s. ad fl.3ij.

At 9 o'clock he will ordinarily be very sleepy and should be allowed to sleep undisturbed until morning. There is no harm in inducing sleep by light hypnosis or by suggestion. If the patient becomes excited during the night the following may be given hypodermically: Morphine sulphate, grain 1/8; hyoscine hydrobromide, grain 1/100; and strychnine sulphate, grain 1/60. If it is necessary to give this hypodermic, do not repeat it during the treatment.

During the treatment the patient should take as much nourishment as possible. As there will usually be a disgust or an absolute refusal of food, this should be appetizing in appearance and taste, of small bulk, and easily assimilable. Egg beaten up in milk, orange or grape juice, albumen,

chicken or beef broth highly seasoned, and rice cooked in milk may be given.

Whenever the patient is seen by the doctor the heart should be carefully examined, and there should be no hesitation in using stimulants, for the battle is won or lost within a few days. Strychnine, caffeine, camphor, and digitalis are the stimulants of choice. Collapse may often be successfully combated by infusion or enteroclysis of normal saline solution.

Following the deep sleep which marks the turn of the tide in the patient's favor there is the period of convalescence, when he is subjected to a building-up process. Drugs are withdrawn as far as possible, although an iron and arsenic combination may be beneficial. The diet is increased gradually, exercise in the open air is instituted, and the patient encouraged to take a hot bath at night and a cold one in the morning. It is at this time, too, if ever, that something may be done for the chronic alcoholic. A brief analysis of the causes of his alcoholism should be made, and they should be explained to him in his own terms. He should be told that the solution of the problem was in his own hands and encouraged to attempt it.

TREATMENT OF ACIDOSIS.

ROWNTREE in the *Saint Paul Medical Journal* for January, 1917, states that alkali treatment is always indicated in acidosis, because a diminution in bicarbonate reserve, as pointed out by J. J. Henderson, is an invariable accompaniment of acidosis regardless of other coexisting changes. The degree of acidosis should be determined preliminary to the administration of alkali, since the degree of acidosis controls the intensity of treatment. The more severe the acidosis the more alkali is indicated. Alkali should be administered at least until the pH of the blood returns to normal. It is desirable perhaps to correct the alveolar CO₂ and alkali reserve as well, although this is not always so readily accomplished.

When the treatment is intensive alkalosis

results, a condition but little studied and little understood.

The usual clinical effects of alkaline treatment are relief of dyspnea, diuresis, with occasionally mental improvement. With lethal amounts of alkali coarse tremors and rigidity develop, and finally vomiting, convulsions, and relaxation of the sphincters. Rigor mortis is immediate and extreme.

Clinically at times edema and ascites develop during alkali administration. Aside from alkali therapy alkalosis is rarely encountered. Levy and the writer have found it only in the following conditions: typhoid, following transfusion in primary and secondary anemia, and in nephritis. Wilson and Stearns demonstrated its presence in experimentally induced tetany in dogs.

At the present time it must be admitted that our knowledge of acidosis is not profound. Relatively simple methods of determining its existence and intensity are now available—the same methods serving for the control of therapy. Through their use a deeper understanding of acidosis must result. More exact, and therefore more effective, treatment can be confidently anticipated.

THE USE OF PITUITARY EXTRACT IN POSTABORTION CURETTAGE.

In an editorial note in the *Medical Record* of December 2, 1916, mention was made of this use of pituitrin, and the statement was ventured that it was first proposed by a writer in *Surgery, Gynecology and Obstetrics* for September, 1916. We have learned that this was an error, as Dr. Jacob L. Bubis, of Cleveland, in a paper read before the Gynecological Section of the New York Academy of Medicine on November 23, 1915 (*American Journal of Obstetrics*, No. 4, 1916), reported three cases in which this measure was resorted to with success. The advantage of giving pituitary extract in these cases he summarized as follows: (1) Preliminary packing of the cervix and vagina to induce softening of the cervix and stimulate uterine contrac-

tions is usually unnecessary. (2) No packing is placed in the cervix or vagina after emptying the uterus. (3) The injection of pituitrin is given after the cervix has been dilated, while the patient is under an anesthetic. (4) Very little blood is lost while removing the placenta piecemeal. (5) The uterine cavity decreases in size as rapidly as its contents are removed. (6) No hot irrigations are necessary. (7) The total operation takes only a few minutes.—*Medical Record*, January 27, 1917.

ORTHOPEDIC METHODS IN MILITARY SURGERY.

AITKEN (*Lancet*, Jan. 6, 1917) states that we have long known that a shoulder ankylosed with the arm by the side leads to a very useless limb, while if ankylosed with arm abducted; in such a position that with the elbow flexed the fingers come easily to the mouth, the mobility of the scapula is developed so as to make up for the loss of the shoulder-joint. Hence, after ankylosis of the shoulder in useless position a cuneiform osteotomy of the humerus is desirable, with the arm dressed in abduction so as to secure union in the useful position.

In children full abduction is permissible, for in two or three years they develop an extraordinary compensatory mobility of the scapula. In adults the arm should be raised to rather less than a right angle, otherwise the elbow may not come quite down to the side when the scapula is dropped, and the patient goes about as if he were offering his arm to a partner for dinner, which might be embarrassing.

Aitken's remarks in regard to injuries about the elbow-joint are illuminating. In 1897-98, when a dresser in the surgical wards in Edinburgh, the writer was taught that every injury about the elbow, except fracture of the olecranon, should be treated in the fully flexed position. This doctrine has been introduced by Caird and Cathcart, who have brought it from Liverpool. The second part of the Liverpool teaching, however, has escaped the Edinburgh teachers, and he looks back with horror on the in-

dustry with which he performed daily passive movements on an unfortunate child with a split fracture of the condyles of the humerus, with the inevitable result that the joint became more painful and more stiff.

Three years later, when he became house surgeon to Robert Jones in Liverpool, he was taught the doctrine of rest—that is, that having flexed an injured elbow it must be left alone for three weeks or more till all tenderness about the joint had disappeared. Then, and not till then, the sling may be slackened a few inches; if, two days later, the patient can move the hand through those few inches, the sling may be further slackened. If, however, the elbow becomes stiff in the new position, it must be again flexed and left to rest for another week or more before again testing it for mobility.

When in 1907 the writer walked round London hospitals, when he was a candidate for the Fellowship examinations, he was surprised and horrified to find that the internal right-angled splint was being recommended for injuries of the elbow. He is still more horrified to find it in use to-day. He knows of no injury about the elbow in which the internal right-angled splint can be regarded as a proper splint.

For this strong and sweeping statement there are two good reasons. The first is that the prominent internal epicondyle is pushed outward, and the line of the elbow-joint is distorted if the fracture is through or above the condyles; the second is that even if the epicondyle be to some extent accommodated in a hole in the splint, the forearm is fixed half-way between supination and pronation, with the palm of the hand against the splint.

The author lays it down as a standing rule that in all injuries of the arm and elbow, and most of the forearm, the forearm must be supinated and the palm of the hand must be directed toward the face. If this is neglected there will be an error in the carrying angle of the elbow, or there will be limitation of the supination in the forearm, a very serious disability of which the author has seen dozens of examples sent to

the Military Orthopedic Hospital. It is not always easy or possible to attain this but he is certain that many surgeons are not consciously and deliberately trying to secure full supination in the early stages of treatment. In injuries of the wrist stiffness in a flexed position is the fault to be avoided, and dorsiflexion is the first preliminary to any treatment. It is a waste of time to attempt massage until the wrist has been dorsiflexed.

In the lower limb the problem of restoration of function is often much more simple than in the upper limb. With a disability which precludes walking any arrangement which makes the patient independent of crutches is a boon. Aitken states that in his hospital for crippled children there is not a single pair of crutches. This because if a child is allowed to swing along on crutches he will not bother to use his limbs properly, and the same is true of the soldier. He pictures various splints, as for extending stiff flexed knees when the stiffness is due to fibrous deposit in and about the joint and muscles. This is a flexion splint useful for flexing stiff knees where there has been fracture of the femur, and the vasti and rectus muscles are matted together and to the bone in one solid mass of fibrous infiltration. The splint is applied and the limb very slowly flexed for some days. Then the splint is removed and the limb is allowed to straighten. Then the process is repeated, each time carrying the flexion about 5 to 10 degrees farther than on the former occasion; and so on for three to five months, until there is some regeneration of muscles. After this massage and exercise carry the process farther. It is only applicable to old cases with dense fibrosis.

As to the method of dealing with troublesome deformities arising from trench foot, they follow the well-known routine lines of treatment of the acuter forms of flatfoot, such as may follow an infective peri-arthritis, a crush, or the idiopathic forms sometimes seen. In the early stage, when the foot is too tender to touch, the patient is rested in bed absolutely, is massaged

daily, and the shape of the feet gradually corrected with some suitable form of splint according to the deformity. When not too tender to be handled, though still too tender for the patient to stand on, the foot is molded more firmly into correct shape in plaster-of-Paris bandages, and molded by the surgeon's hands while the plaster is setting. Later the patient is able to get about in a walking plaster.

The methods of twisting and molding a foot by means of plaster bandages are simply an application of familiar methods of correcting clubfoot in infants, either with bandages or with sticking-plaster. It is only an application to plaster bandages of methods in every-day use by surgeons who are accustomed to employ the direction and tension of their bandages for purposes of correcting or checking deformities.

THE HARVARD INFANTILE PARALYSIS COMMISSION AND ITS WORK IN MASSACHUSETTS.

LOVETT (*Boston Medical and Surgical Journal*, Jan. 11, 1917) after describing the organization and the activities of the commission deals only with one of the three branches of activity, namely, the after care of paralyzed children.

Infantile paralysis causes a motor impairment which in many cases limits normal activity and in others causes serious and lasting disability. The critical time is not in the first two or three months after the attack, but in the subsequent months up to the end of the second year, during which period the question of ultimate function in most cases is determined by the treatment received. Certain cases are so lightly affected that they will recover no matter what treatment is pursued, others are so severely paralyzed that no treatment is of much avail, but in the majority of cases treatment at this time has great effect on the final amount of restoration of power.

Neglect or ineffectual treatment during this time means unnecessary crippling and disability to so large a number of children that it is an economic blunder to allow it to

happen, aside from any humanitarian aspect that the matter may have.

The State care of infantile paralysis was instituted in Vermont in January, 1915, and is still in force there. It was begun by the State of New York (exclusive of New York City) in October, 1916, and by Massachusetts, where the epidemic began later, in November, 1916. Various cities have established clinics for the care of these cases, and various other communities have under consideration schemes of public care. The situation is too serious to be met by the ordinary agencies of relief.

The treatment of the acute stage of poliomyelitis is effectively and thoroughly carried out in a modern way by the practitioners of Vermont, New York, and Massachusetts, the States of which the author has first-hand information. The later operative treatment of the disease is, on the whole, also modern, efficient, and surgically sound as carried out by the competent orthopedic surgeons of the United States. The treatment of the convalescent stage of the disease (from the disappearance of the tenderness until two years after the outset) is practically about what it was thirty-five years ago, not having changed as has the treatment of the early and late stages. Massage, electricity, and braces are the methods of treatment most in vogue in the United States to-day during this stage.

The essentials of a modern treatment of this stage are, first, an accurate diagnosis, which can be made only by a careful examination of every available muscle or muscle group in both arms, both legs, back, neck, and abdomen. This is a perfectly obvious requirement for accurate treatment. It takes time, care, anatomical knowledge, and skill. Second, the aim of treatment should be the development of affected muscles to their highest ultimate efficiency. The Vermont figures have shown that partial paralysis is nine times as common as total, when muscles are carefully examined individually. The affection is not, therefore, so often a hopeless loss of power as a muscular weakening. This lays stress on muscular development as the key-note of

treatment. Third, the use of braces is conservative and protective rather than therapeutic, and the "brace treatment" of this stage does not exist any more than does a "crutch treatment" of fracture of the leg. Braces must be used in many cases to enable patients to go about, to prevent muscular stretching and joint loosening, and to avoid deformity, but they constrict the muscles, they prevent normal use of the limb, and they are heavy. They should be worn during the first year only for walking, and removed when the small amount of walking safe at this time has been done.

Fourth, fatigue is detrimental, easily induced, and delays muscular recovery. The power of weak muscles may be permanently destroyed by overuse, and unprotected overuse may result in muscular stretching and permanent deformity. The overuse of massage and therapeutic exercise is capable of inducing harmful degrees of fatigue. The physician who allows unrestricted walking with or without a brace in the first year takes on a heavy responsibility.

Fifth, massage is useful in proper dosage in preserving muscular tone, promoting circulation, and preventing muscular atrophy. Its overuse is dangerous.

Sixth, electricity with mild currents does no harm and perhaps does good, but is not a powerful remedy, and its benefit has been denied by some writers. It has done much harm by being used over long periods of time, often none too carefully, during which no other treatment has been pursued, and the parents have been deluded into the belief that proper treatment was being given, while valuable time was being lost and permanent deformity being acquired.

Seventh, muscle development by muscle training is the important part of the modern treatment. Loosely given, it is harmful, because a child will inevitably use strong rather than weak muscles in a loosely formulated movement, and the person prescribing such exercises must have a sufficient knowledge of functional anatomy to formulate exercises calling only on the weak muscles. This knowledge is not as a

rule possessed by the ordinary masseuse. Therein lies the chief obstacle to the general use of the method, the scarcity of persons sufficiently trained to prescribe proper exercises, and the formulation of such muscular exercises by persons not specially trained to give them effectively.

To embody these requirements in a practical scheme the following plan has been adopted by the commission:

Clinics are held in Boston and in other parts of the State where physicians may bring their patients for examination and free consultation. These clinics are so arranged that each patient receives as much time as is necessary for the thorough examination of the case, and the formulation of treatment. Specially trained women are to serve in Boston and other parts of the State to assist the family physicians, if they wish it; in carrying out muscle training at home, in seeing that apparatus is worn if ordered, that fatigue is avoided, that the physician's directions are followed, and that the patients do not fall into the hands of fakirs.

So far as possible each family is enlisted in the responsibility of the case. When she is intelligent, the muscle training is taught to the mother and supervised by the nurse. Coöperation has been arranged with the District Nursing Association and other similar organizations whereby the follow-up work is distributed and the care assisted by them under the technical supervision of the commission's nurses.

The patients are instructed to return to the clinics at intervals suited to the individual case, but it is intended to make the home care the main feature of the scheme, and this plan is intended to cover a sufficient number of years to obtain final results.

It is desired to work only through the family physician, to assist and not to supersede him, and to furnish him with the record of each case and suggestions for treatment whether or not he is present at the clinics.

The central clinic of the commission is held at the Children's Hospital on Tuesdays, Thursdays, and Saturdays at nine

o'clock. With this clinic coöperates the Orthopedic Clinic of the Massachusetts General Hospital, held each morning at nine o'clock. To the latter clinic are referred all adult cases and patients from the north and west ends, East Boston, and Charlestown.

For groups of cases who cannot easily come to Boston, the Children's Clinic unit will be transported direct to such centers in the States as desire to have it, at the direction of the Commissioner of Health. Such clinics in out-of-town centers will be repeated at sufficient intervals to afford proper follow-up care. In these outside centers, just as in Boston, trained women will be assigned to the supervision of the treatment of such cases under the direction of the family physician. The service of the outside clinics and of the follow-up care is without charge. It is not the intention of the commission to attempt to establish clinics in any locality maintaining private clinics for the purpose.

The aim of the commission is to furnish to those physicians who wish it assistance in carrying out the modern treatment of infantile paralysis with the hope that by so doing the whole standard of treatment may be raised and that Massachusetts may hold as prominent a place in the therapeutic side of this disease as it already holds as a pioneer in the study of its etiology. For this purpose funds must be contributed, and it would be desirable if, so far as possible, independent schemes of relief might be correlated to the main enterprise.

GUNSHOT WOUNDS OF THE HEAD.

In an editorial in the *British Medical Journal* of December 2, 1916, commenting on a paper by Lieutenant-Colonels P. SARGENT and GORDON HOLMES, it is observed of the 1239 cases of gunshot wounds of the head admitted to eight hospitals in London, the records of which were examined, 46, or 3.7 per cent, died. This figure includes a certain number of serious and hopeless cases evacuated to England from the base hospitals in France as quickly as possible,

on whom no operation was performed, or in whom exploration showed that there was no reasonable prospect of recovery. Nine such cases died within two weeks of their arrival at home, and in the majority of the others death occurred within three months. Only five patients are known to have succumbed after this period. In almost all instances spread of septic infection was the cause of death.

Thirty-four of the forty-six fatal cases had been operated upon before their evacuation to England; in six no operation had been performed; and in the six others definite information on the point could not be obtained. The reporters distinctly state that they have traced and have heard of no case in which death occurred in England when the dura mater had not been lacerated by the wound, and had not been opened by operation.

It is, they say, now generally recognized that much of the paralysis, sensory and visual disturbances, and other symptoms seen in the early stages, are due, not to local destruction of the brain, but to concussion, edema, and vascular disturbances that often extend widely beyond the primary injury. Allowing for this, they state that they are yet, on the whole, surprised at the amount of improvement that has occurred. A small proportion of men with penetrating and perforating wounds of the skull originally seen with paralysis, sensory disturbances, hemianopia, and other symptoms, had already returned to active service, and others were employed in wage-earning capacities. The amelioration of symptoms was especially striking in many of the cases of hemiplegia, diplegia, or quadriplegia due to injury of the superior longitudinal sinus. As improvement is generally slow and continuous over long periods, it is to be expected that a considerable proportion of men with even severe head injuries will be able to lead useful and active lives.

Though during the early stages after the infliction of the wound many patients present symptoms of some degree of mental deterioration, especially dulness, loss of memory, irritability, and childishness, the

records tend to show that in the majority of cases these symptoms disappear or diminish. Cases of mental disturbance or actual insanity necessitating confinement under certificate were found to be surprisingly rare.

With regard to epilepsy, the results of the investigation were equally reassuring. Among the 610 cases of which complete notes were obtained, fits had occurred after evacuation to England in thirty-seven, or 6 per cent; but in eight only one convulsion had occurred, and in only eleven were the convulsions frequent. In a considerable proportion of the cases only one or two seizures occurred after arrival in England, and in several of the others they were arrested by the administration of bromide, and it is suggested that it is advisable to give bromide regularly to all serious cranial injuries until the wound is healed, and for some months afterward. In five of the cases secondary operations were performed with good results; in two small abscesses were drained; and in three spicules of bone were removed. Among the cases invalided out of the army various forms and degrees of paralysis, sensory and visual disturbances, and other symptoms due to the primary cerebral injury or to further damage to the brain by septic infection, hernia formation, or in the course of treatment, were common. Various subjective symptoms which could not be attributed to local injury were also remarkably frequent; the most common was headache, increased by noise, fatigue, exertion, or emotion, as well as attacks of dizziness, nervousness, and deficient control over the emotions and feelings. Many exhibited a change of temperament, becoming depressed, moody, irritable, or emotional, and unable to concentrate attention on any physical or mental work. In a few there were major hysterical symptoms, such as paralysis, anesthesia, or visual disturbances. The symptoms were very similar to those seen in neurasthenia, especially of traumatic origin, and although they incapacitated the subject from active service were not irrecoverable. They were entirely independent of the site

or severity of the original wound, were often as severe when the scalp had been injured as in a serious compound fracture of the skull, and seemed to develop equally whether an operation had been performed or not.

Of the cases evacuated to England with cerebral hernia death occurred in 24.16 per cent. Of cases in which bullets, shrapnel balls, or fragments of metal were lodged in the brain, ninety-seven were traced; the foreign body had been removed before transference to England in twenty-seven instances, but in many of them the bullet or piece of metal was only just inside the skull, and was removed along with the fragments of bone. Of these, three died, all within three months; others were alive at varying periods up to twelve months after the infliction of the wound. The fate of sixty-nine cases sent to England with the missile still in the brain was traced; in all the foreign body was at some considerable distance from its point of entry; a few were rifle bullets and a few shrapnel balls, but the great majority were smaller or larger fragments of shell, often multiple and inaccessible, yet only four died. Of these four, two were sent home in what appeared to be a hopeless condition, and both died within two months; one died six weeks after an unsuccessful attempt to remove a bullet which lay close to the falx cerebri, and the fourth died from rupture of a cerebral aneurism, the fatal issue being wholly unconnected with the continued presence of the missile. Of the sixty-five surviving cases, twelve had been wounded less than three months before they were inspected, twenty-five between three and six months, twenty-one between six and twelve months, and seven over a year. In 76 per cent the wounds were soundly and completely healed, and in 30 per cent complete recovery had occurred, and no symptoms of cerebral lesion were present. In 40 per cent the neurological symptoms had improved to a remarkable extent; in 10.5 per cent much disability (hemiplegia, hemianopia, neurasthenia, etc.) persisted, but its existence depended on the damage done

by the missile in its course, and not on its presence. Fits were observed in only four cases, and in two of these they occurred early and were transient.

Among the 610 cases of which complete records were obtained, fifty-three were submitted to operations in England; in thirteen of these the operation was clearly of a trivial character, consisting merely in the removal of sequestra from an unhealed wound; twelve were for intracerebral abscess, and ten of these recovered, a remarkable result in view of the very much higher rate of mortality in cerebral abscess of otitic origin. In three cases in which an operation was performed for the removal of a projectile, one proved unsuccessful and the patient died; another was also unsuccessful, but the patient did not die; and the third was successful and the patient recovered. In three cases a cerebral hernia was shaved off, and two of them died of meningitis. The third, although cerebrospinal fluid escaped from time to time after the operation, survived, but he still had a hernia cerebri.

In summing up the results of their investigation the authors say that the later results of head wounds seem to be much more satisfactory than had been generally expected. Later complications, such as cerebral abscess, are relatively rare, and serious sequelæ, such as insanity and epilepsy, much less common than had been foretold, but they recognize that this conclusion is subject to the qualification that in only 15 per cent of the cases had it been possible to learn their condition after more than one year. Still, as they say, even such facts as are available are a safer guide to treatment than opinions based merely on *a priori* reasoning.

Another conclusion they draw is that there are no grounds for supposing that more radical operations abroad are called for. "It seems," they say, "extremely doubtful if surgical intervention other than that necessary for the drainage and healing of the wounds diminishes appreciably the risk of later complications, or can modify, except in a harmful direction, the course

of these cases from the functional standpoint. Every possible step should, however, be taken to prevent the development of a hernia cerebri." Their records show also that many patients with foreign bodies lodged deeply in the brain recover, and are scarcely more liable to serious complications than men in whom the brain has been merely exposed and lacerated. Any attempt to remove such foreign bodies which may involve spread of infection or further destruction of brain tissue is consequently inadvisable.

PRESENT STATUS OF THE TREATMENT OF BLADDER TUMORS.

GERAGHTY (*West Virginia Medical Journal*, December, 1916) divides tumors into papilloma—benign and malignant; papillary carcinoma; and in a separate class he places the adenocarcinoma, squamous and scirrhous carcinoma. This because the handling of papillary carcinoma requires a technique very much more developed than is necessary for the handling of the other carcinomas.

In malignant papilloma there are present principally changes in the shape, staining properties, and nuclei of the epithelial cells without any marked evidence of cancerous infiltration. Experience, however, has shown that these changes are indicative of cancer and that patients die of cancerous metastases when these changes in the papillæ are the only evidence of malignancy which exists. In a series of twenty-five papillomata examined histologically 68 per cent showed the changes characteristic of malignant papillomata. When, however, the malignant papilloma has advanced to the point where infiltration of the bladder wall occurs we apply to it the term papillary carcinoma. This differentiation is arbitrary and is simply one utilized as a working basis.

As a differentiation between malignant papilloma and papillary carcinoma, cystoscopy, combined with other clinical methods, is of greater aid than the histological picture alone. Finding on cystoscopic ex-

amination the presence of necrotic papillæ on an otherwise benign looking papilloma, the presence of edema around the margin of the tumor or nodules in the mucous membrane in the neighborhood of the tumor, the presence of an intractable cystitis, and when tumors are situated on the posterior bladder wall, feeling on rectal examination the slightest induration in the bladder, are points in the differential diagnosis which have served best. It must be admitted that none of these conditions may be present and the tumor may still have invaded the bladder wall. When in doubt concerning the nature of the tumor fulguration may be adopted as the therapeutic test. After a few applications of the fulguration current it can usually be determined whether the tumor is one suitable for this form of treatment. When the surface of the tumor is vigorously fulgurated and the slough does not separate, or when it becomes covered with calcareous deposit, this is evidence of advanced malignant changes in the deeper portions of the tumor.

Fulguration has been employed in fifty-three cases; in twelve the tumors were inoperable carcinomata and fulguration was employed as a palliative measure or to test out the efficiency of this treatment in that type of case. In none of these cases was any marked impression made upon the tumor, while the treatment was rather painful in the scirrhus type. In forty-one cases with papillomata, in 34 per cent of whom the tumors were multiple, three cases ceased treatment before the tumors had disappeared. In two cases, although the tumors were small and apparently papillomata, the response to fulguration soon indicated that they were really papillary carcinoma. In one of these a successful resection was subsequently performed; while the other case, a very elderly man, developed a senile dysentery and auricular fibrillation, of which he shortly afterward died. In the remaining thirty-six cases the tumors in every instance entirely disappeared. There seems to be quite a marked difference in the promptness of response to

fulguration between the benign and the malignant papillomata. The typical benign papillomata disappeared with astonishing rapidity; on the other hand malignant papillomata disappeared slowly, and frequently required many times the amount of treatment which would be necessary for the benign papillomata of the same size. In one instance it required almost nine months to completely remove a malignant papilloma which covered the whole left lateral wall and which was composed probably of not one tumor but of multiple papillomata fused on the surface, giving the appearance of one broad extensive tumor. In this instance this form of treatment was continued because of the definite and progressive decrease in the size of the tumor and the rapid separation of the burned areas after each treatment. Of twenty-five papillomata examined histologically, seventeen showed the changes characteristic of malignant papilloma, but all of them were removed by fulguration, the benign and malignant differing from each other only in that the response was slower in the malignant types. The incontestable proof that at least some of these tumors were malignant or cancerous is that two of them subsequently died of cancerous metastases, although the bladder was free from tumor.

Of the thirty-eight patients in whom fulguration was successful in removing the original tumor or tumors, recurrences are known to have occurred in seven cases. In all of these, with one exception, the recurrence was present in less than a year. In one patient recurrences are observed every few months, although it has been over three years since the original tumor was destroyed. This tendency to recurrence seems as active to-day as it was during the first year. The recurring tumors with one exception have all responded to fulguration, like the original tumor. The one exception is of extreme interest (Roeder). This patient had a papillary tumor several centimeters in diameter just back of the ureteral orifice which disappeared fairly rapidly under a combination of radium and fulguration. For several months after the

disappearance of the tumor the mucous membrane of the tumor-bearing area seemed entirely healthy. Shortly afterward, however, cystoscopic examination showed a peculiar reddening and some slight bulging of the mucous membrane without any ulceration or definite tumor formation. This was at first thought to be a localized inflammatory area. The process, however, seemed to spread, and a piece removed with the cystoscopic rongeur showed the patient to have an infiltrating carcinoma of the bladder wall with the mucous membrane on the surface practically intact. This is undoubtedly a case in which cancer cells from a malignant papilloma have metastasized into the deep bladder wall and there continued to grow after the tumor mass had been entirely removed. A malignant tumor of this type has been studied histologically by Burger. Patients with multiple tumors seem more apt to have recurrences than those in whom only one tumor is present. While it is too early to draw definite conclusions regarding the percentage of cases that will remain permanently cured, the results to date would seem to warrant us in believing that a not inconsiderable per cent will be free, because the tendency for recurrence grows progressively less after the first year.

The failure of excision to cure more than a very small per cent of bladder tumors, whether benign or malignant, led surgeons to adopt more radical measures, so that during recent years resection for all tumors, namely, the complete removal of the tumor-bearing area together with all the coats of the bladder wall, has been the procedure advocated.

Experience has shown that when the growth has infiltrated the bladder wall, resection with as wide a margin of healthy mucous membrane as seems necessary is the only method which offers much hope of success. Resection is indicated when the tumor is of such a size that it can be completely removed even though it necessitates the transplantation of one or other ureter. It is quite generally conceded that resection should not be undertaken when the tumor

has infiltrated close to the vesical orifice, and particularly when it has invaded the prostate. It is also questionable whether resection should be performed when the tumor is so extensive that transplantation of both ureters will be necessary. When the tumors are multiple resection again is contraindicated unless the tumors occupy an area which will allow their removal in one piece. Tumors occupying the anterior bladder wall are the ones most favorable for resection. The transperitoneal method except in occasional cases is not to be recommended, as a sufficiently perfect exposure can be secured without exposing the patient to this unnecessary risk.

The position and size of the tumor should be determined as accurately as possible before operation by means of cystoscopy. The bladder should be emptied and filled with air, so that when the bladder is subsequently opened the infected fluid may not soil the incised tissues. Immediately on opening the bladder, which should be done in such a way as to avoid trauma to the tumor, the tumor should be thoroughly cauterized *in situ* before any further manipulations are carried out. In order to avoid sponging a glass tube connected with a suction pump should be placed in the base of the bladder, but not allowed to come in contact with the tumor. If sponging becomes necessary, sponges wet with alcohol should be used, and the sponges which come in contact with the tumor-bearing area should not be applied to other portions of the bladder wall. The main emphasis should be laid on the thorough destruction of the tumor by the cautery before resection is attempted. This having been done, the bladder wall can be incised with the cautery or knife with less danger of implanting tumor cells. Resection has been the operation carried out in twenty-four cases, and nine of these cases were well two years or longer after the operation. Of these nine cases five of the tumors belong to the malignant papilloma type, and four were small circumscribed papillary carcinoma in which it was possible to remove a considerable margin of normal bladder wall. In none of the

carcinomas extensively invading the bladder wall has a cure been obtained.

During the past eighteen months about fifteen tumors have been treated with radium alone or with radium in combination with fulguration. Experience has not been sufficient to draw any definite conclusions regarding the ultimate value of this method. It has been employed most frequently on malignant papillomata in combination with fulguration, and the effect of the radium in these cases has been most striking. In three cases in which fulguration had been employed over long periods of time, and in which the lesions had resisted very stubbornly all efforts to entirely destroy them, the application of radium to the tumors seemed entirely to change their nature. In all three cases after receiving 500 to 600 mg. hours of radium applied directly against the tumor, the tumor disappeared with astonishing rapidity on resuming fulguration. When possible the radium is applied directly against the tumor by means of the Young Radium Cystoscope, using a tube with an opening on one side so that the beta rays can be applied directly to the tumor while the rest of the bladder wall is screened. The combination of radium and fulguration in this type of case seems to promise much. So far it has not succeeded in definitely eradicating the papillary or other infiltrating types of carcinoma.

TREATMENT OF PRURITUS ANI.

MURRAY (*Proctologist and Gastroenterologist*, December, 1916) finds streptococcus fecalis cultures in 94 per cent of these cases. The local pathology he regards as a coincidence which has nothing to do with the primary etiology of pruritus. Moisture of the anal skin he considers as due to the low-grade inflammation, and that it is not a leakage of mucus resulting from a proctitis. The pruritic condition will not be improved until the phagocytic power of the blood is increased up to or near normal, and the pruritus will return if the phagocytic power of the blood is again lowered.

Local applications without the use of

autogenous vaccine make no lasting improvement.

There is no necessary connection between itching and diabetes. Vaccine should be given in heavy doses. Where there is a complicating infection the vaccine of the complicating bacterium is given with streptococcic vaccine. Vaccine doses run from 850 to 1300 million to 1 Cc.

THE USE OF WHOLE BLOOD IN HEMORRHAGE.

OLIVER (*California State Journal of Medicine*, January, 1917) alludes to the commonly accepted belief that clotting of the blood depends upon the action of the fibrin ferment (which is normally formed only after the blood is shed) on the fibrinogen which is in the circulating fluid; this fibrin ferment-complex now being designated as "thrombin." He quotes Howell to the effect that when thrombin is added to fibrinogen coagulation takes place by the formation of the fibrin. Thrombin only occurs in shed blood, hence it is evident that all the elements entering into its formation must be present before it is shed; to this the name of "prothrombin" or "thrombogen" has been given.

To account for the conversion of prothrombin into thrombin, the presence of a ferment is assumed, which Morawitz has called "thrombokinase." Calcium is essential to the action of thrombokinase. The exact rôle of calcium is unknown. As to the origin of the kinase, it is known that as soon as the blood is shed there is a disintegration of the blood platelets and also of the leucocytes. Moreover, there is a marked diminution of blood plates in hemorrhagic conditions, and when these are supplied by transfusion the bleeding stops for a time, but with the reduction of these elements again hemorrhage will occur. The blood plates have been demonstrated to be the nuclei about which is concerned the formation of fibrin. It has been demonstrated that the retardation or suppression of clotting is frequently attributable to the action of an antithrombin which neu-

tralizes thrombin, and that only after the removal of the antithrombin or the addition of a further amount of thrombin can coagulation be induced. It is also possible, especially in cases of cirrhosis, that the fibrinogen content of the blood may fall, so that even in the presence of an adequate proportion of thrombin the clot formed is not sufficient.

Welch believes the underlying condition in these bleeding cases has to do with the endothelial lining of vessels, etc.; that there is a disturbance of balance of the ferments of the cells due to malnutrition evidenced by hemorrhage in the serous cavities. This is often a toxic effect.

When normal serum from whatever source is added to the blood of any of these cases, it will cause prompt clotting. From this it is reasoned that there is lacking in the blood of some otherwise normal individuals a kinase or activating substance that would normally cause coagulation. It is argued, however, that it is not for this reason that the hemorrhage stops, but because of quick nutritional repair of the damage done the endothelial lining of vessels, by action of toxins of bacteria, intestinal, septicemic, etc.

The disease "melena neonatorum" in many and perhaps all instances is characterized by a relatively sudden disappearance of prothrombin from the blood; the condition usually develops during the first two weeks after birth and is often fatal, possibly due to lack of formation in the liver of prothrombin.

Bernwald was one of the first to treat a case of hemophilia with serum in 1897. In 1902 Welch reported good results in the treatment of melena neonatorum by the use of normal human serum, probably as much as 300 Cc. He also used small doses over a long period (nine months), as much as 3500 Cc., employing it for the nutritional value.

Almost every form of serum has been used, and from all good results have been reported. Among the sera used are rabbit, horse, antitoxic sera, normal human, citrated blood, pipetted blood, and whole

blood (human). The serum of animals, on account of difference of species, by reason of the metameric proteid content, is capable of sensitizing, like other foreign proteids, and produces the cardinal symptoms of anaphylaxis (serum sickness). The homologous sera do not have that effect, and are of distinct nutritive value, especially in the malnutrition of infants, who cannot take nourishment by mouth.

It has been demonstrated that the simplest, quickest, and most efficient method is to obtain about 20 Cc. of blood from the vein of a healthy person and inject immediately into the gluteal muscles of the patient. Two needles should be used—one can be inserted into the patient, so as to save time. These intramuscular injections are not painful nor do they leave any bad results, but are promptly absorbed. It seems strange with the results obtained that there have been so few reports; probably on account of the simplicity of the method.

Oliver reports six cases, none of them entirely convincing.

FLAVINE AND BRILLIANT GREEN IN THE TREATMENT OF INFECTED WOUNDS.

BROWNING, GULBRANSEN, KENNAWAY and THORNTON (*British Medical Journal*, Jan. 20, 1917) thus set forth the defects and vices of antiseptics in common use:

Antiseptics are fixed by protein material in general; hence, when bacteria are suspended in a fluid containing abundant protein, such as serum, very little of the substance is free to act on the organisms. This explains the well-known fact that the antiseptics in common use, almost without exception, show a reduced potency when tested in serum—that is, under conditions resembling those in which they would be used in the treatment of wounds. For instance, the efficiency of corrosive sublimate is reduced one hundred times by serum.

By destroying the life of cells and inhibiting phagocytosis, antiseptics deprive the body of one of its most important weapons in combating local infection.

By producing layers of dead tissue they supply a nidus for the proliferation of organisms.

Owing to their deficient penetrating power they fail to reach organisms situated in the tissues, even supposing that they act efficiently on those disposed on the free surfaces.

The properties of the ideal antiseptic would appear to be great potency against all microorganisms in the presence of protein material—for example, serum.

No deleterious effect on phagocytosis.

Absence of irritant action on living tissues in general, so that it may be applied to delicate surfaces such as mucous membranes.

A suitable stimulating effect on connective tissue cells, so as to promote growth of healthy granulation tissue.

The compound, when absorbed, must not be highly toxic for any specialized tissue; thus, even if strychnine were the most potent antiseptic known, its effect on the central nervous system would probably entirely preclude its therapeutic use.

In the researches for an efficient antiseptic the authors have directed attention to the bacterial potency of undiluted serum as compared to that in watery solution. Of the effect on tissues of all the substances examined, the compound flavine stands out as possessing the highest sum of desirable properties for therapeutic use—that is, great antiseptic power, along with relative non-toxicity toward phagocytosis and lack of irritating effect on epithelium. The triphenylmethane compounds, especially brilliant green and crystal violet, are extremely active in the case of cocci, but toward *B. coli* their bactericidal value is considerably lower. On the other hand, flavine is much the most potent of all substances investigated toward both groups of organisms. In the case of *B. coli* suspended in serum, flavine is approached only by mercuric chloride (although the latter is about ten times weaker); but the disadvantage of the mercury salt lies in the serious effect which it has in interfering with phagocytosis. This action of mercuric chlo-

ride *in vitro* affords a striking parallel to its well-known toxic effect on living tissues. Thus, as compared with the other substances under examination, a much higher effective concentration of flavine can be brought safely into contact with the tissues, in this way allowing for dilution in the wound, and giving the best prospect of dealing efficiently with organisms which may be present.

Flavine is diamino-methyl-acridinium chloride, which was originally prepared by Benda at the desire of Ehrlich, and was found to have a very marked therapeutic effect in trypanosome infections.

The comparative inefficiency of the common antiseptics under practical conditions has been paralleled by their behavior in these tests; on the other hand, the acridine compound flavine has exhibited outstanding characters, especially high bactericidal power, which is enhanced rather than diminished by the presence of serum, combined with very little inhibitory effect on phagocytosis. The recommendation of this substance for clinical use, based on the results of the laboratory tests, has appeared to be well justified; a 1:1000 solution (equivalent on the basis of bactericidal concentration to an 80-per-cent solution of carbolic acid in the case of staphylococci) has been applied to the surface of wounds without causing pain or local irritation, and the skin has not been harmed by its use. In addition, there have been no local or general toxic effects, even when quantities of the solution have been kept in contact with the tissues for a considerable time, or when it has been injected into the tissues. The granulations which form in the presence of the acridine compounds are both of good color and texture, and the whole process of healing advances rapidly. Especially significant in regard to the action of these substances has been the retrogression observed in wounds when applications of acridine compounds have been temporarily replaced by some other agent; on reverting to their use the wounds have again become markedly less septic and the advance of healing has been resumed.

The writers would especially emphasize the possibilities in the direction of prevention of sepsis which would be likely to attend the use of flavine or brilliant green in recent wounds, applied during that dangerous period between the infliction of the wound and the establishment of an adequate local defensive mechanism (granulation tissue, etc.). It is precisely at this period that the employment of an efficient antiseptic will prove of value by leading to the destruction of virulent organisms before they have obtained a foothold and have multiplied extensively. The stimulation of tissue cells is a highly important factor at this stage, and there is reason to believe that such stimulation can be attained by the application of flavine or brilliant green. Of course, such treatment is to be used in addition to operative procedures necessary for obtaining free access. It has become the custom at the out-patient department of the Middlesex Hospital to treat all casualty cases by washing out with a 1:1000 solution of flavine, and the conclusion has been justified that a wound so treated will in all probability heal by first intention.

The author concludes as follows:

A substance belonging to the acridine group, flavine, has been found to possess extremely powerful bactericidal and antiseptic properties, which are enhanced rather than diminished by admixture with serum. In this respect flavine differs from all the powerful antiseptics in common use.

In the presence of serum flavine is the most potent bactericide of all those investigated for both staphylococcus and *B. coli*, and it is equally efficient for the enterococcus and for anaerobes such as *B. oedematis maligni*.

Flavine, in relation to its bactericidal power, is very much less detrimental to the process of phagocytosis and less harmful to the tissues than the other substances; hence much higher effective concentrations can be employed without damaging the tissues or interfering with the natural defensive mechanisms. Brilliant green also compares most favorably with the other antiseptics in these respects.

Clinical results have substantiated the estimate of the therapeutic value of flavine and brilliant green based on the characters above noted.

THE ANEURISMS OF WAR.

VON HABERER (*Arch. f. klin. Chir.*, 1916, cvii, 611; quoted in *Surgery, Gynecology and Obstetrics*, February, 1917) sums up the results of his experiences in the operative treatment of war aneurisms. He gives a collective report based on the indications and results obtained in his total of 72 cases treated operatively in the Reserve Hospital at Innsbruck.

He divides his treatment of aneurisms into three periods. In the first he treated 13 aneurisms by ligature with generally good results. In the second period he treated 29 aneurisms, 16 by ligature and 13 by suture—5 lateral, 8 circular. In the third period he treated 30 aneurisms, 6 by ligature and 24 by suture—7 lateral and 17 circular.

The situation, treatment, and results in these 72 cases are shown in the following table:

Site of the Aneurism.	Total.	Method of Treatment.			Died.	Recovered.
		Circular suture.	Lateral suture.	Ligature.		
Carotis communis*	5	3	2	..	..	5
Carotis interna.....	1	..	..	1	..	1
Subclavian.....	14	3	6	5	2	12
Axillaris.....	5	2	2	1	..	5
Brachialis.....	8	2	1	5	..	8
Radialis.....	1	..	..	1	..	1
Iliac.....	3	3	..	..	..	3
Femoralt.....	18	10	..	8	3	15
Poplitealt.....	4	2	..	2	..	4
Tibialis antica.....	4	..	..	4	..	4
Tibialis postica.....	4	..	..	4	..	4
Tibialis ant. and post.	2	..	1	1	..	2
Maxillaris interna.....	1	..	..	1	..	1
Temporalis.....	1	..	..	1	..	1
Glutaca.....	1	..	..	1	..	1
Total.....	72	25	12	35	5	67

* One case ligatured later.

† One case amputated later.

Of the five cases with a fatal operative result, four were treated by ligature and one by suture. The results show that of 72 aneurisms operatively treated, five died and 67 recovered. Of the recovered, two were subsequently amputated; the other 65 cases

recovered without mutilation. Von Haberer believes that the correct treatment of every gunshot aneurism must be operative; and his experiences lead him to the following conclusions:

The ideal operation of every gunshot aneurism is vascular suture.

Vascular suture may be executed much oftener than is generally believed.

Vascular suture must as a general rule be circular rather than lateral, because lateral suture narrows the lumen too much, when there are large lateral defects; and because there is also the greater danger of thrombosis of the sutured region endangering the function of the suture.

Suture is not indicated in very small arteries, in which ligature assures a collateral circulation.

There will always be cases, particularly in the large arteries, in which ligature must be undertaken. Suture is excluded when there are extensive tissue defects, and especially in severe infection, the disappearance of which cannot be anticipated.

Where ligature is necessary, the ligature must be made either within the sac or close to the sac, taking the utmost care of the collaterals.

Aneurisms should be operated upon only in properly equipped hospitals, and if possible not in the field hospital. Trained assistants and an experienced surgeon are necessary. It is obvious that when there are dangerous complications, such as hemorrhage or very serious infection, aneurisms must be operated upon immediately.

The best time for an aneurism operation is between two and three weeks after the injury. During this time one is able to judge if a serious infection exists or not; and if this is evident there should be no further delay.

Slight infections may occur weeks later and even after complete healing of the wound. They do not forbid operation nor suture when indicated. In doubtful cases it is best to take the precaution of draining for a few days.

All late operations are made unneces-

sarily difficult by the calluses resulting in the meantime.

For the same reason, procedures such as compression of the aneurism are more harmful than useful. They only cause calluses and inflammatory changes in the sac.

In all gunshot injuries in which the projectile in its passage has struck one of the larger vessels, judgment has to be made very careful, because even weeks later, when the patient moves around, an aneurism may manifest itself.

Infected aneurisms may stimulate abscesses, therefore the utmost care is advised in the examination.

Whereas in a successful vascular suture the patient can be treated as recovered after a month, this is not the case in ligature, because here slight disturbances of the circulation remain for a considerable time, which render the man unfit for the heavy work at the front, especially in winter.

The results of vein transplantation in larger defects of the arteries are very doubtful.

The strength of a vascular suture is extremely great, as is proved by the possibility of putting a simultaneous fracture in extension immediately after circular suture.

Aneurism followed by paralysis of the nerves is very frequent, not because of lesion of the nerves through the shot, but more an account of pressure from the aneurism.

The clinical details of the 72 operations are given.

TREATMENT OF COMPOUND FRACTURES.

WAINWRIGHT (*Pennsylvania Medical Journal*, February, 1917) thus outlines an ideal plan for open uninfected fractures:

As to the maintaining of the fracture uninfected: The wound must be treated at the earliest opportunity. First of all free drainage must be obtained. Skin must be further incised if necessary, side pockets followed up, and, in other words, all areas exposed to infection must be made acce-

sible. Then tubes and light gauze dressings must be so arranged that irrigations with Dakin's solution either at intervals through a syringe or continuously through a Murphy drip apparatus can be kept up. A satisfactory way is to put the tube or tubes into the deepest parts of the wound and bring them out through the gauze dressings and out through a sterile bandage. The sterile bandage with the tube lying against it is then surrounded by a sterile towel conveniently pinned so that at desired intervals the nurse may unpin the towel, turn it down, and reach the tubes, which are thus constantly kept in a sterile field. The gauze inside the wound must be lightly placed with the sole purpose of holding the tubes in place. We must soon begin to accept what Sir Berkley Moynihan and a few others are just beginning to teach us, that there "never yet was such a thing as a gauze drain"—a gauze cork perhaps, and an inefficient one at that, but never a drain. Also our dressings must be light, so that Dakin's fluid may get away and there really be an irrigation. Fluids must be caught in a photographer's tray for instance, or they must even run into the bed if necessary. They must not be held back. By plugging the wound area with cotton or oil-silk dressings, which sog up the dressing and the wound and soak them in old albumin containing fluids which have not only lost their antiseptic quality but have perhaps become good culture media, we will prevent just the effect we are trying to produce.

Wainwright believes that at least in civil practice, where we get most of our wounds early, we can, by working with sufficient attention to detail, keep the large majority of our fractures in the uninfected class, and then after three or four days or perhaps longer we can treat such a fracture, even though there be an open wound, by whatever method in the individual case seems best adapted mechanically.

It is somewhat more difficult to lay down ideal principles concerning the particular types of mechanical fixation. We must, however, strenuously insist again that the ideal must be a fixation which will allow

frequent dressing without disturbing the fragments. Wainwright believes that, after the preliminary treatment to render the fracture uninfected, as time goes on the fixation methods will gradually narrow down to three, namely, open operation and suture of fragments with kangaroo tendon; second, fixation by an Albee sliding graft; or, third, extension by the Steinman pin.

RINGWORM OF THE SCALP CURED BY X-RAY.

KNOWLES (*Pennsylvania Medical Journal*, February, 1917) observes that the diseased areas in ringworm of the scalp are of a round or oval shape, varying in size from a fraction of an inch to several inches in diameter; occasionally a large portion of the scalp is partially denuded of hair by coalescence of the lesions. The patches are usually covered by a fine ashen scale, through which many hair stumps emerge. The involved area has a "gooseflesh" appearance, the follicles being unusually prominent. The hairs are held loosely in the follicles and pull out with little traction. The incubation period of the disease is supposed to be three days. If the areas are untreated, the disease may last from infancy to adolescence and then disappear spontaneously. Ringworm of the scalp is a disease of childhood, and is of the greatest rarity in the adult. The large-spored fungus is more apt to give rise to small patches, the reverse holding true in regard to the small-spored type. The most contagious variety of fungus is supposed to be the *microsporon audouini* (small-spored type). Hair stumps, when removed from the diseased area, show macroscopically a peculiar grayish-white sheath, surrounding and closely adherent to the root portion of the hair; this consists of fungus.

The disease is readily distinguished from alopecia areata by the total baldness, unbroken and firmly attached hairs, lack of scales and absence of fungus in the latter; from seborrheic dermatitis by the reddened patches with greasy yellow scales, lack of broken-off and firmly attached hairs

in the latter; from psoriasis by the sharply margined reddish patches covered with silvery white scales, the unbroken and firmly attached hairs; from favus by the sulphur-color cups in the latter and the presence of an entirely different type of fungus; from erythematous lupus by the age of the patient, totally bald areas with wide-open follicular mouths, the reddish color and the atrophy of the skin in the latter; and from age baldness by age, totally bald areas, lack of scale, and broken-off hairs. Naturally in all of these various conditions the absence of the ringworm fungus proves that *tinea tonsurans* is not present.

The complications of ringworm of the scalp are impetigo, a disease starting as a pustule or vesicle and drying up into yellow, honey color, "stuck on crusts," furunculosis, and subcutaneous abscesses.

The average case of ringworm of the scalp is curable by older medical methods in from six to nine months, and in certain instances a longer period is required. When the Roentgen ray is employed the patient is rendered incapable of communicating the disease in from twenty-five to thirty days after the exposure. In the treatment of favus the salve or lotion method has to be employed over a period of years, while the Roentgen ray eradicates the disease after one thorough depilation.

The commoner medical remedies employed are sulphur, mercury (usually the bichloride), iodine (commonly a 25-per-cent alcoholic solution), chrysarobin, and pyrogallol. Exclusive of the Roentgen rays Knowles has obtained the best results with the two following preparations: One drachm of the crystals of iodine mixed with 7 drachms of goose grease; and 20 grains of chrysarobin combined with an ounce of lanolin. Although numerous investigators have attempted vaccine treatment, Strickler is the strongest advocate of this method.

Depilation by means of the Roentgen rays was introduced by Sabouraud in 1904; he described the method employed by himself and Noire in one hundred cases with

one exposure of each patch. Divided intensive methods of treating this affection have been perfected by Holzkecht, Kienboch, Adamson, Coolridge, MacLeod, and MacKee. The three usually employed are those devised by Sabouraud, Kienboch, Adamson, and Holzkecht. Tint (Hampson's No. 4) of Sabouraud's scale equals five Holzkecht units, which is the equivalent of 10 X units of Kienboch. Knowles has employed Hampson's radiometer, which is modeled after the Sabouraud scale.

The patient's hair having been clipped, there is more than one patch, mark each one by drawing a circle about it with ink and, after being exposed to the ray, mark with a cross to show that it has been treated. Each patch if isolated from the others is to be rayed in succession at the same sitting; the other patches being covered by lead plates to protect them from double exposure. If there are many disseminated lesions involving the whole scalp it should be marked off in segments and each section similarly treated. The patient should be six inches from the anticathode and held at the same distance by the tripod of the tube throughout the whole exposure. This spot must be exposed to the rays until the pastille assumes the color of tint No. 4 (Hampson). The length of exposure varies on different days and cannot be fixed. Fifteen days after the exposure the hair loosens and begin to fall. Three days later the scalp is given a brisk shampoo with sulphur soap; this is repeated for several days, after which time the area which has been rayed is usually completely bald. The area so treated remains bald for approximately two months, after which a fine downy growth of hair is observed. Total restitution of the hair is usually complete in four months.

If the first exposure is insufficient to produce epilation, a second séance may be necessary four weeks after the original exposure; the latter may be carried out without fear of producing permanent baldness. By using a hard tube the maximal safe dose may be obtained in seven minutes with the

patient eight inches from the anticathode. A softer tube, which should always be used with greatest care, changes the pastille to tint No. 4 with a shorter exposure. Depilation of the entire scalp was required in but ten of the eighty-three cases treated. Sabouraud has treated 2000 cases by this method without any cerebral or intellectual symptoms arising therefrom.

The Roentgen-ray treatment of ringworm of the scalp is a step forward in the cure of an exceedingly chronic and troublesome affection.

EARLY CARE OF SUPPURATIVE CONDITIONS OF THE MIDDLE EAR AND MASTOID.

WEINBERGER (*Pennsylvania Medical Journal*, February, 1917) holds that the two great factors in treatment are the removal of the source of infection and the increasing of bodily resistance. In spite of our best care, patients occasionally develop mastoiditis. They should then be put to bed at once and have cold applied to the mastoid region.

The mastoid may recover permanently, especially so if the source of infection ceases to exist.

The mastoid may become operative. Determination of the exact time when a mastoid becomes operative is rather difficult and somewhat of a personal equation. Generally speaking, operation should be performed for two reasons: (a) To give the patient the safest and quickest chance for recovery, and (b) to preserve good hearing.

Operation should not be deferred when we feel convinced that the chances of uncomplicated recovery and good hearing would be jeopardized by delay. It is well, however, first to allow nature the opportunity to develop resistance to the particular infection in the system generally, and to establish a barrier against its extension locally. We should then give assistance by removing every single infected cell, for a poorly drained mastoid is just as liable to recur, and bring on complications or leave a

chronic running ear, as a preëxisting unoperated mastoid with persisting nose and throat infection.

Although clinical findings are not an absolute guide, yet careful weighing of clinical evidence gives us a fair indication for the time best suited and safest for operation. A culture of the middle-ear discharge, when obtainable, should be made and the offending organism and the probable severity of the infection determined. The streptococcus capsulatus is particularly rapid in its destruction and extension to adjacent structures, and is especially dangerous.

Skiagraphs should be made of both mastoids, and when interpreted by a competent roentgenologist are of great value.

A differential white blood count repeated at intervals of twelve hours, if no operation is performed, is important, for having found the character of infection it gives us a fair idea of the amount and rapidity of destruction in a given time. Temperature, severity of pain, and degree of tenderness are to be relied upon only as they assist in interpreting the main factors, namely, character of infection, skiagraph, and differential white blood count. We know that operative mastoids occur in which no discharge becomes manifest either before or at the time of operation, and the amount of discharge varies so that in some cases we can hardly imagine how it is possible for so much pus and serum to be formed and drain through the opening in the drum. Intermittent, remittent, or early sudden cessation of discharge with or without pain is unfavorable, as is increasing pain and tenderness. The symptoms cannot be relied upon, however, without being often led astray in interpreting the main consideration. A bulging posterior wall is unfavorable, but not an absolute and positive indication for operation, particularly so when there is no discharge. We cannot afford, however, to wait for its appearance when at any time pus has been or is manifest, and it is distinctly unsafe to delay operation if present under these conditions.

The principles involved in the surgery of

purulent conditions of the middle ear and mastoid are precisely the same as in the surgery of pus conditions generally—namely, early and thorough drainage. It is far better to operate on a mastoid that might possibly have recovered from the attack without operation than to subject the patient to the deleterious and dangerous intracranial complications with the high mortality occasionally consequent on the delay, uncertainty, and procrastination incident to the questionable hope of ultimate recovery, because (a) operation stops bone necrosis about vital structures; (b) the ear is dry and the drum intact—thus the patient is not subjected to any future chronic discharge with its constantly attendant danger of labyrinthine involvement and intracranial complications; (c) perfect hearing results; (d) the operative mortality of early uncomplicated mastoids is very low; (e) the period of illness, pain, suffering, and anxiety is very much shortened.

The conditions may enter upon the chronic stage. At the end of four weeks

we regard the discharging ear as entering this stage providing that previously acute conditions have subsided or disappeared and bodily resistance has been increased by means of autogenous vaccines, and attending source of infection in the nose or throat has been removed.

Autogenous vaccines are of very little value unless properly prepared. When the vaccine is that of the primarily causative organism the benefit derived from its use is often remarkable, and never fails to produce an effect upon the discharge. All extraneous and contaminating organisms must be isolated and ignored by plate culture, the material for culture having been obtained aseptically from the middle ear by means of a fine cotton-tipped probe directly to the opening in the drum. One or two injections at intervals of five days will usually effect a cure; occasionally several more are needed, but when it is necessary to give more than two injections the author feels that the vaccine is not what it should be and makes a new one.

REVIEWS.

ANATOMICAL NAMES, ESPECIALLY THE BASEL NOMINA ANATOMICA. ("BNA.") By Albert Chauncey Eycleshymer, B.S., Ph.D., M.D., Assisted by Daniel Martin Schoemaker, B.S., M.D. With Biographical Sketches, by Roy Lee Moodie, A.B., Ph.D. Illustrated by numerous wood engravings and by two full-page plates in red and black. Extra muslin, \$4.50 net. William Wood & Co., New York, 1917.

This volume is designed to give a "complete and correct list of BNA terms." Approximately one-half of the book is an index, whereby anatomical terms of divers sorts may readily be referred to their correct equivalents in the BNA nomenclature. An interesting and valuable biographical list is likewise incorporated in the volume.

Wilhelm His in 1889 suggested the appointment of a commission on anatomical nomenclature. This commission consisted of Kolliker (chairman), O. Hertwig, His,

Kollmann, Merkel, Schwalbe, Toldt, Waldeyer, and v. Bardeleben. The Anatomical Society voted the adoption of the report of the Commission on Nomenclature at the session in Basel in 1895. The expression BNA is an abbreviated title for the list of approximately 4500 anatomical terms accepted at this meeting.

The BNA since its adoption in 1895 has steadily grown, and most of the leading text-books of anatomy now make use of the BNA terms. It is essential that physicians, laboratory investigators, and students familiarize themselves with the BNA nomenclature, so that they may deal intelligently with the newer anatomical literature.

There are, doubtless, many inconsistencies in the BNA. Some of the names are ill-chosen. Indeed, in many instances, the old

names are to be preferred. However, an ideal and flawless anatomical terminology may be impossible. Comparative anatomy is the only sane basis for an anatomical nomenclature. However, when one views the vastness of the field and the many variations in structure in comparative anatomy, one sees the difficulty in formulating a satisfactory list of names for anatomical structures. Certainly the BNA is the most satisfactory list of names offered up to the present, and until we have something better it should be more generally used.

Professor Eycleshymer and his assistants are to be congratulated in compiling this work. The book not only gives the BNA names, but by a method of cross-reference the equivalents in the BNA are readily found. The added biographical list by Dr. Moodie is instructive and helpful and gives a touch of completeness. The book is, without doubt, the most complete and valuable reference work of its kind in the English language.

J. P. S.

FOOD AND THE PRINCIPLES OF DIETETICS. By Robert Hutchison, M.D., F.R.C.P. Illustrated. Fourth Edition. William Wood & Company, New York, 1917. Price \$4.00.

The earlier editions of this book have been referred to in terms of commendation in the *THERAPEUTIC GAZETTE*. Dr. Hutchison is Physician to the London Hospital, and in charge of the out-patients in the Great Ormond Street Hospital for Sick Children. The text in the present edition has been thoroughly revised, and the important subject of vitamins has been introduced in a new section.

The book contains a little over six hundred pages and is one of the best upon the important subject of which it treats. Opening with the definition that food "is anything which when taken into the body is capable either of repairing its waste or of furnishing it with material from which to produce heat or nervous and muscular work," it proceeds, page by page, from fundamental facts concerning dietetics to the employment of various foods in health and disease.

BETTER BABIES. A Guide for the Practical Care of the Mother and Young Child. By Samuel A. Visanska, M.D. Foote & Davies Company, Atlanta, Ga., 1917.

This is a book, with large type and wide spacing, which covers a little less than two hundred and fifty pages. The author states that his reason for writing it has not only been "to see the world filled with better babies," but also that he might present views and facts which he thinks will prove useful to his professional colleagues in the care of infants who may come under their charge. It is also written in such a way that it may be put into the hands of the mother and nurse. The illustrations give practical points in regard to the use of the abdominal binder and diaper, and considerable information is given concerning food, sleep, and general care.

THE REPORT OF THE PATHOLOGICAL DEPARTMENT AND THE DEPARTMENT OF PSYCHIATRY OF THE CENTRAL INDIANA HOSPITAL FOR THE INSANE. By George F. Edenharter, M.D., Superintendent, Indianapolis, Ind.

The present volume represents No. 6 in the series which have been published by the Staff of this institution, and consists of two parts—one giving a summary of the year's work in the Department of Clinical Psychiatry and Pathology, with papers read and published during 1913-1914, and the second part with similar work done during 1914-1915. The report also gives us information in regard to the course which has been authorized in Mental Pathology and in Nervous Diseases by different members of the Staff, so that physicians and students may go to the institution and gain additional information. The publication is creditable alike to the State which publishes it and to the medical men who have brought together within its covers a large amount of valuable material.

TRAUMATIC SURGERY. By John J. Moorhead, M.D., F.A.C.S. W. B. Saunders Company, Philadelphia and London, 1917. Price, cloth, \$6.50 net; half morocco, \$8.00 net.

This book, dedicated by the distinguished author to his wife, is designed to place in one volume the information necessary to diagnose and treat all the usual and most

of the unusual effects of accident and injury. It embodies the measures which the writer has found most practical in his own experience, and shows an effort to standardize the treatment of wounds, infections, burns, and the usual fractures.

Moorhead has a fixed and abiding belief in the value of open air and sunshine in the case of infected wounds in any location and from any source. Indeed, he states that aeropathy and heliotherapy make skin-grafting unnecessary.

The book is profusely and very excellently illustrated. There are evidences of careful study of current literature, the conclusions from which seem to be adopted and recommended at times on grounds which even to a kindly reviewer would seem inadequate.

In Dupuytren's contracture the author is especially interested; he devotes considerable space to electrical injuries, those incident to compressed air and illuminating gas, traumatic appendicitis, and traumatic neuroses. He appends a table of tests and standards. He also discusses X-ray Burns, and has a final section on what he calls Medico-legal Phases.

The book is filled with useful information; nor can any one read it without profit. Perhaps a minor criticism might be to the effect that this information does not always seem to be thoroughly digested.

THE PRACTICE OF UROLOGY. By Charles H. Chetwood, M.D., LL.D., F.A.C.S. Illustrated, Second Edition. William Wood & Co., New York, 1916.

The second edition of this book, admirable both in text and illustration, will be hailed with satisfaction not only by the expert worker in this branch of surgery, but by both general practitioners and students, since it has been written on broad lines, but with that satisfactory attention to detail most useful to him who consults it for guidance in the treatment of cases with which he is not largely experienced.

The book opens with a brief section on anatomy, with special reference to its surgical bearing. Thereafter follow sections on the diagnosis of sexual and urinary maladies and general technique. Chapters

on Sero-diagnosis, Sero-therapy, Function, Renal Diagnosis, and Roentgenography together with Maladies of the Penis and the Surgery of the Urinary and Genital Tract are systematically written; the chapters upon Renal Disturbances are particularly commendable.

The book closes with a section upon Syphilis. The treatment laid down is characterized by sound common sense based on ripe experience and on the practical knowledge of all the newer theories and procedures.

SYPHILIS. By Loyd Thompson, Ph.B., M.D. Illustrated. Lea & Febiger, Philadelphia and New York, 1916.

An admirable work, brief, lucid, and convincing. The author states that syphilis as a disease requires knowledge in all fields of medicine. The subject has been presented in a thoroughly practical manner. Hence the work centers largely on Diagnosis and Treatment, with especial attention called to the need of laboratory aid.

There is a section on the history of the disease, calling attention to its importance from the standards of geographic distribution and economic bearings; and one upon the etiology, followed by the pathological clinical history, and clinico-laboratory diagnosis; with an excellent section upon prognosis; one upon prophylaxis both present and to be; and, finally, one upon treatment viewed from all sides.

The second portion of the book is taken up in accordance with systems, the Circulatory System being first considered. Thereafter the Respiratory Tract; the Gastrointestinal Tract, the Gall-Bladder, Spleen and Pancreas, etc.

The third part is devoted to Congenital Syphilis, considered both broadly and in its regions.

It is decidedly the most satisfactory book that has recently appeared on the subject, one showing the wide knowledge of the work of both the clinician and scientist, supplemented by a singularly extensive personal experience. It is a book as helpful to the specialist as it is to the general practitioner.

THE THERAPEUTIC GAZETTE

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ORIGINAL COMMUNICATIONS.

ETIOLOGY AND DIAGNOSIS OF DISEASES OF THE ACCESSORY SINUSES FOLLOWING INFLUENZA.¹

BY GEORGE MORRISON COATES, A.B., M.D., F.A.C.S.,

Surgeon Ear, Nose, and Throat Department, Pennsylvania Hospital; Professor of Diseases of the Ear, Philadelphia Polyclinic and College for Graduates in Medicine; Consulting Laryngologist, Philadelphia Orphanage and to Sharon Hospital, etc.

The etiology of all accessory sinus disease may be described under two heads, namely, the primary or exciting, and the secondary or contributing cause. The first factor is, then, the causative microorganism, and it might seem superfluous to speculate upon its nature, the title of this symposium being what it is, although in reality, from the loose association of the terms "grippe" and "influenza," there is some need for further study and clarity upon this point. If we understand by the term influenza only a disease caused by the influenza bacillus, there is of course no need to search further for our infecting organism. This organism indeed has always ranked high in the list of the causes of acute sinusitis, certain observers, such as Häjek, Zarnico, Lillienthal, Weichselbaum, Skillern, and others, placing its infective power about equally with the pneumococcus and streptococcus, and as the causative factor in about the same relative number of cases.

The terms influenza and grippe have become so confused in their application that they are often used indiscriminately, and but little attempt is made toward a differential diagnosis between these two conditions, although it is my belief that they are distinctly different. Influenza is, of course, caused by the influenza bacillus

alone, while grippe, if we accept the term, should be applied to a pathological condition produced by certain other organisms, causing the various well-known symptoms that we are all familiar with. This disease, if it can be called a distinct disease, occurs in epidemics nearly every winter in this section of the country, giving symptoms that run the gamut from trivial ones, the so-called "grippy colds," to the serious ones that terminate in suppuration in the sinuses and middle ears, meningitis, brain abscess, pneumonia, nephritis, endocarditis, etc.

It is my belief that most of the epidemics we see are of this type, the difference in severity of various epidemics depending upon the different degrees of virulence of the causative organisms under different conditions. For instance, during the epidemic of the winter of 1915-16, which was described as an epidemic of influenza, cultures were obtained from thirty successive cases of different degrees of severity at the Pennsylvania Hospital, the majority of them showing the pneumococcus alone, in a few the streptococcus was present, while the bacillus influenzae was not found once. That it played some part in the epidemic, however, may be inferred from the fact that it was discovered in pure culture in the cerebrospinal fluid of a case of meningitis of Drs. Stengle and Packard which ultimately made a recovery.

¹Read by invitation as part of a symposium at the meeting of the Northern Medical Society of Philadelphia, March 9, 1917.

I should say, therefore, that unless a strict interpretation of the term influenza is demanded, the causative agent in these cases may be any of the common pus-producing organisms, headed by the three mentioned above.

Contributing causes are those which may put the mucous membrane lining of the sinuses in a condition susceptible to attack and infection. These are deviations of the septum, spurs and ridges, hypertrophies of the turbinates, hyperplasia of the mucous membrane of the nasal passages, polypoid degenerations from old infections, or any mechanical factor that may produce congestion of the sinus mucosa with inhibition of its usual ciliary action and bactericidal properties; occlusion of the ostia with resulting interference with drainage and ventilation, and retention of the products of inflammation. The normal sinus mucosa is probably frequently exposed to infection from the inspired air, but still the infective agents rarely obtain a foothold if the sinus is normal, being rapidly swept out through the ostia by the action of the cilia. It is only when this action is interfered with and frustrated that infection takes place.

Naturally the virulence of the infective agent plays a part, for if bacteria of a high degree of virulency are the invaders the infection is more likely to become firmly seated. It is probable that in every acute nasal infection some of the sinuses are involved, the ethmoid cells being, from their exposed position, the ones that usually suffer first. The influenzal or grippal infection causes an acute rhinitis with turgescence of the mucosa, congestion and edema of the lining membranes of the sinuses with inhibition of their functions, partial or complete occlusion of one or more ostia, rarefaction of the contained air through absorption of the oxygen content, and the soil is prepared for an acute supuration within the cavity so affected. Even if no infection takes place, many of the symptoms of sinus disease are produced—tenderness, headache, and eye-ache especially. These disappear promptly when the ostium becomes liberated and the nega-

tive pressure is relieved. If this does not occur and infection follows, with accumulation of pus, the same symptoms appear this time caused by positive pressure, and they are augmented by the absorption of toxins.

In the diagnosis of this condition, as with all others, the history, both past and present, may throw much light upon the subject. Frequently the patient has suffered from similar attacks in the past, often even in winter, and sometimes several times during the season. These are usually cases of chronic sinus inflammation, showing acute exacerbations with each nasal infection. Moreover the patient is frequently sensitized to certain types of microorganisms due in part to the chronic sinus inflammation. This history of the present attack will be that of influenza or grippe, or acute "cold," with its well-known symptoms, but in an exaggerated form or a failure to convalesce at the proper time.

The period when the sinus or sinuses take part in the general infective process may be marked by a high degree of fever, although fever may be absent entirely; constipation, increased headache, sometimes more localized, more prostration. The fever is, as a rule, not high, 100° to 102° being, perhaps, the average. The headache is frequently general, dull and heavy or shooting and stabbing in type, intermittent at times, worse on bending the head downward, often worse in the early morning, clearing up more or less by noon. Headache, acute sinusitis, may be said to be always present during some portion of the twenty-four hours.

The location of the headache cannot be depended upon to determine the particular cavity involved, although in a general way the inflammation of certain sinuses is more apt to give rise to headache at a certain location. Thus a dull pain between the eyes often denotes invasion of the anterior ethmoid cells; in the occiput and down the neck, the posterior ethmoid or the sphenoids; in the frontal or temporal regions, the frontals or maxillaries. The latter may cause toothache in either the

upper or lower jaws. It is evident, then, that the pain follows the distribution of the fifth nerve branches. A localized headache may be very misleading, however. If the sinus infection is unilateral, the headache is apt to correspond to the side of head affected. Stuffiness or occlusion of the nose is often complained of, accompanied by anosmia, as in most cases of acute rhinitis; mucopurulent discharge is more often present, although it may be absent. This discharge makes its appearance either at the anterior nares or drops into the nasopharynx, and each type has its diagnostic value.

Tenderness is a valuable diagnostic point, but in testing this, in a unilateral case, comparison must be made with the well side, since some individuals are abnormally sensitive to pressure over the sinuses, just as they often are over the mastoid processes. This symptom cannot be adduced in sphenoid or ethmoid disease, since these cavities are too remote from the surface. Rarely is it found over the antrum of Highmore. In the case of the frontal sinus it is of value if the pressure is made on the thin floor of the sinus above the inner canthus of the eye. Tenderness of the eyeballs to pressure is also worthy of note.

Examination of the nose frequently reveals the presence of muco-pus; if seen anteriorly and coming from beneath the middle turbinate, disease of some or all of the cells of the first series (anterior ethmoid, frontal and maxillary) is suspected. If, when this is wiped or washed away, more pus soon appears in the same locality, the diagnosis is assured. Pus flowing forward between the middle turbinate and the septum, or seen posteriorly by the mirror, suggests disease of the cells of the second series (the posterior ethmoids and the sphenoid). There may, however, be no pus evident, even in the presence of an empyema of some of the sinuses, due to occlusion of the ostia. In this case the application of the suction apparatus, after thorough shrinking of the mucous membrane around the ostia with cocaine and adrenalin, will probably cause it to make

its appearance. Suction in the office is usually obtained by the use of an electric vacuum pump connected by rubber tubing with a glass nasal tip. This latter is placed in one side of the nose, and the patient instructed to say the letter K, which raises the soft palate and closes off the nasopharynx.

At the bedside where the electric pump is not available, a large metal syringe may be used to advantage, the piston being forcibly withdrawn when the K sound is made. Of course, great engorgement of the turbinates, especially in the regions of the sinus openings, is always a suspicious sign, even in the failure to obtain pus, for the headache may be of the vacuum variety. The employment of the nasopharyngoscope, an instrument built on the principle of the cystoscope, and for use in the nasal chamber, will at times reveal the presence of pus in the deeper portions of the nose where it might otherwise be overlooked.

Probing or washing a sinus, except in the case of the antrum, serves no useful purpose in acute sinus disease, the small diagnostic value it may have being more than offset by the traumatism caused and the subsequent swelling induced by its employment. In the case of the antrum it is different, for here the entrance is made by a small needle puncture beneath the inferior turbinate, causing little or no discomfort, and the subsequent washing through the hollow needle giving more information in regard to the condition of this sinus than all other means that can be employed. Transillumination of the antrum, when it is positive and when there is a distinct shadow on one side only, is a great help, but when negative cannot be relied on with certainty. This applies equally to the frontal sinus, the ethmoids and sphenoid being, of course, out of the question for this means of diagnosis because of their location. Due allowance, in the case of the frontals, must be made for thick bony walls and for sinuses of unequal size, which are the rule rather than the exception. The technique of obtaining radiographs has improved so vastly during the last few

years that a radiogram is now of great diagnostic value, but it must be properly interpreted, and even then is at times very misleading. The leucocyte count is usually not excessively high except in fulminating cases, although there may be a moderate degree of leucocytosis.

The title of the "Diagnosis of Sinus Disease following Influenza" seems to preclude the discussion of chronic sinus infection, but we must not forget that chronic sinusitis frequently has its origin in neglected acute cases of this type. The diagnosis differs in no essential points from the outline just given for the acute cases. I would like to say a few words, however, on the diagnosis of sinus disease, acute and chronic, in children. In young children the antrum is the only sinus well developed, and much doubt has been expressed as to the frequency of its infection. Coffin of New York has recently studied radiographically a large series of children in the Manhattan Hospital who exhibited chronic mucopurulent nasal discharges, and found that a large proportion of them showed

shadowy antra by the ray. A corresponding series of children without that symptom was negative. This control test should certainly give us food for thought. It is at least certain that in children the maxillary sinus, and later the ethmoids, may be the seat of suppuration, and that this infection not infrequently makes its presence known by an orbital abscess, pointing near the inner canthus or above the infraorbital ridge, and that many cases showing mucopurulent discharge are in reality cases of sinus infection.

The diagnosis of acute sinusitis is usually not a difficult task for a competent rhinologist with proper instruments for examination, but without such a nasal examination it must be largely a matter of guesswork, albeit the guess may be a good one. It is a matter of gratification that the profession at large is keenly appreciative of the value of prompt diagnosis and treatment in these conditions and the dangers that lurk behind their neglect. I think the arrangement of this symposium by a society of this character is good evidence of this appreciation.

THE MEDICAL TREATMENT OF SINUS DISEASE.¹

BY GEORGE B. WOOD, M.D.,

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Disease of the accessory sinuses of the nose, more particularly in its chronic form, is somewhat analogous to suppurative conditions in other portions of the body, yet it differs in one or two important points. While recognizing that the treatment of suppurative foci, no matter in what part of the body they are found, is essentially surgical, inflammatory conditions of the accessory sinuses, especially when acute, can be influenced by medicinal treatment because of the peculiar anatomy of the accessory sinuses. The accessory sinuses are non-collapsible cavities communicating with the outside atmosphere by natural ostii which open into the nasal fossæ, and are so placed

that the swelling of the turbinal bodies may interfere more or less with their drainage. The essential point to remember is that these cavities when diseased are not as a rule closed areas of inflammation, but because of their natural openings can drain to a greater or less extent without operation, provided that the contents of the nasal fossæ are not in themselves obstructive. It is of course recognized that under certain conditions this drainage is not sufficient to permit the lining mucous membrane to spontaneously recover, and then it is that operative procedures must be undertaken.

Acute inflammatory disease of the accessory sinus rarely calls for surgery, whereas chronic empyema seldom recovers without surgical help. Occasionally we see an acute

¹Read by invitation as part of a symposium at the meeting of the Northern Medical Society of Philadelphia, March 9, 1917.

sinusitis of such a severe type that rapid destruction not only of the soft parts but also of the bone takes place, and of course here operative interference is absolutely necessary; but in the large majority of acute cases minor surgical procedures such as the repeated puncture of the antrum, the removal of the anterior half of the middle turbinal, or the drilling of the sphenoidal cavities, are productive of more harm than good. I am convinced that frequently acute sinusitis has become subacute or even chronic from too much surgical interference. The devitalization of an inflamed mucosa by trauma, the difficulty of avoiding secondary infection, the filling of the cavity with blood-clots, and the possible lowering of the patient's general resistance by shock are cogent reasons why we should avoid unnecessary surgery.

It is difficult to formulate a general rule for the treatment of even acute accessory sinus disease, and this because of the variance of the severity of the infection, the difference in the behavior of the different accessory sinuses themselves, and the problem of the nasal drainage modified by the particular anatomy of the individual with whom we are dealing. Sinusitis as a complication of grippe or other serious systemic infections is of more serious import as a rule than that following a simple coryza. In those types complicating acute general infections confinement to bed is generally essential, while in the less severe infections more freedom is permissible. Sinusitis causes less pain and general disturbances in individuals where the openings of the accessory sinuses are larger and less obstructed by the turbinal bodies or by deflections of the nasal septum than where the openings are small and the natural drainage interfered with. When the symptoms of sinusitis are purely local without general disturbances I do not believe that any form of internal medication or general treatment is of much value, unless it has for its object local effect. If accompanying the sinus disease there is evidence of general systemic infection the conditions must be met with

appropriate treatment. But where there is such general disturbance the sinusitis is almost always present as a complication or sequela, and only in rare instances does acute sinus infection, *per se*, give rise to much systemic intoxication.

GENERAL INDICATIONS.

There is no doubt that atropine is of distinct value in the serous stage of the disease. By checking secretions it materially aids the drainage not only from the nasal fossæ itself, but probably by lessening the edema of the lining mucosa of the sinus renders more patulous the internal aspect of the ostium. In chronic suppurative conditions of the nose it is of no value and perhaps harmful. Atropine should be given in small doses at frequent intervals until some dryness of the throat is noticed. When the secretions are very thick and tenacious potassium iodide in small doses is sometimes helpful in aiding drainage. Hexamethylenamine according to experimental evidence is not excreted in the nasal secretion, but clinically it does seem to exert a certain bactericidal power when given in large doses. If given in these large doses in the first twenty-four hours of the attack, this drug at times seems to abort the attack, but I have never seen a case in which any benefit was manifest when it was administered after the condition had existed a few days. The adult dose should consist of from 15 to 20 grains, given three times a day, accompanied by the ingestion of large quantities of water. If the drug is to be given in sufficient dosage to produce any effect on the nasal mucosa, a large amount of it is excreted by the kidneys, and unless we dilute it by producing polyuria there is grave danger of severe cystitis. Fortunately the cystitis clears up very rapidly on withdrawal of the drug and the drinking of large quantities of water. When necessary drugs to control pain are perfectly permissible, but in few cases is morphine necessary, because sinus headache usually comes on some time in the early morning, frequently after the patient has gotten out

of bed, and disappears in the late afternoon, so that the patient is free from pain during the night. This is especially true in the subsiding stages.

Local non-surgical treatment in acute sinusitis is of distinct value and has for its object the relief of pain and the promotion of better drainage from the nasal fossæ; also it aids in preventing extension of the disease to other sinuses and the possible infection of the Eustachian tube and middle ear. External applications of hot or cold help not only in the relief of pain, but materially aid in reducing congestion. In the early stages of the disease cold is more useful than heat in limiting and keeping down the edema, and in some persons gives more relief than heat. Quite frequently, however, the cold seems to increase the headache, though occasionally it acts almost miraculously in the relief which it brings. If continuous cold is required the ice-cap is the best form by which to administer it, but where it can be properly administered the ice compress is probably more efficacious and less disagreeable to the patient. In the same way the hot-water bag is more easily used but probably less efficient than moist heat. The latter can be easily applied by wringing a large towel out of hot water and repeatedly applying it to the face and head.

The local internal medication of the nose has for its prime object the shrinking of the turbinal bodies. Even temporary contraction is of distinct value, as the drainage which can then take place tends to lessen the congestion and edema within the sinus cavities. For this purpose cocaine will be found to be the most efficient drug, but it should be only applied by physicians, and then not promiscuously to the whole of the mucous membrane, but in a fairly strong solution, say 10 per cent, by means of the cotton applicator directly to the region surrounding the ostium of the sinus involved. This application, however, should be done exceedingly carefully so as to avoid bruising of the tissues in the immediate neighborhood of the sinus opening.

Strong solutions of adrenalin should be absolutely avoided, as the relaxation which sometimes follows this application is so intense as to produce an absolute blockage of the whole nasal cavity for twelve hours or more. In a well-diluted solution it can be used by the patient at home where there is continued engorgement of the turbinal bodies. I am in the habit of prescribing some such solution as the following: Antipyrin 6 grains, 1:1000 adrenalin chloride solution $\frac{1}{2}$ drachm, and enough water to make one ounce; 5 to 10 drops of this mixture can be instilled into the nose by the patient at home every six hours without danger of causing any excessive reaction. The position when applying the drops is important, as it is usually necessary to get the solution toward the upper part of the nose. This can be accomplished by having the patient lean his head backward over the edge of the bed until the top of the head is directed toward the floor. The solution of course may be used in an atomizer if preferred. Promiscuous douching of the nose during acute rhinitis or accessory sinus disease should not be permitted, though the physician may at times find it necessary to use a little warm boric acid or normal salt solution to remove from the floor of the nose stagnated or partially dried accessory sinus pus. The mucosa of the nose should be carefully protected and soothed by the frequent application of a non-irritant oily medication, used either by medicine-dropper or atomizer.

Sometimes when the anatomy of the nose permits I have experienced a great temptation to wash out the cavities through the normal openings, but have not been able to convince myself that this procedure ever hastens the desired end. Again, in acute antral suppuration where there is great pain one is sometimes strongly tempted to puncture the antrum, hoping thereby to relieve the internal pressure. It must be remembered, however, that in the early stages the pressure is due to the edema of the mucosa as well as to the accumulation of serum, so that the point of the entering needle may not reach the free fluid at all, but simply

leads the injected fluid into the already serous-soaked mucosa. It would seem to be better treatment in these cases, in which the ordinary less radical measures fail to give relief, to go the limit and remove the anterior end of the inferior and make a sufficiently large opening through the bony wall into the antrum to permit of good drainage. The same thing holds true in acute suppuration of the sphenoidal sinus. When the disease has lasted long enough so that the condition approaches the subacute type, lavage of the cavities is probably a very useful procedure even if a small amount of trauma is necessary to gain access to the cavity.

As I said before, the treatment of chronic accessory sinus disease is surgical, and medical applications are used in a purely supplementary manner, but may be important adjuncts. The injection of alcohol into an accessory sinus cavity is not an extremely painful procedure and greatly helps in its sterilization. Argyrol used in the same manner has about its only use in the whole field of nose and throat disease, but even then is not as efficacious as alcohol. Alcohol should be used at first in a 50-per-cent solution and the strength of it increased as the tolerance of the patient permits. The antrum is about the only cavity in which this method of treatment can be utilized. Injections of bismuth paste have in some hands given very good results. This is especially true of the frontal sinus, where it has been used after the frontal duct has been enlarged by some surgical procedure. Where the opening of the cavity attained by operation is blocked by granulation tissue various caustics are necessary, and the best of these I find to be trichloroacetic acid. Its action is very rapid, almost painless, and easily controlled by the subsequent instillation of normal salt solution. Nitrate of silver in strong solution may be used for the same purpose, but it is not sufficiently caustic to be of great value. A chromic acid bead is also useful, more particularly where a small circumscribed area needs to be destroyed.

Vaccine therapy is of doubtful value in accessory sinus disease. In the acute conditions it is useless and may be actually harmful. It may be tried if desired in the more chronic cases, especially those which refuse to yield to radical operations or when the patient shrinks from operative interference. The chief difficulty with the use of vaccine in nasal conditions is that a true specific autogenous vaccine is very difficult to obtain. In making the culture one must be very careful to avoid contamination from the nostril, and this is almost impossible unless some special method is adopted to prevent it. Again, even when the pus has been obtained directly from the sinus without contamination, it is sometimes difficult to obtain a culture from it, and I have in several instances failed to find organisms even after most careful culturing by an expert bacteriologist.

If a vaccine is used it should be an autogenous one, as the promiscuous shotgun therapy of stock vaccine is not scientific and therefore to be deprecated, and it has not yet been shown that the injection of dead bacteria is without danger. As a prophylactic measure to prevent recurrence of sinusitis the use of vaccines can be tried, and will probably be of as much use as when they are employed to prevent the ordinary infection of the upper respiratory tract. If some particular organism such as the micrococcus catarrhalis can be isolated from the secretions of the individual suffering from recurrent attacks, it would seem plausible to try the autogenous vaccine. However, we must tell our patients that this organism is not the only one that can infect the upper respiratory tract, and hence we cannot promise an absence of further infection.

In closing I want to lay particular emphasis on this thought: Careful and appropriate treatment of acute accessory sinus infection will greatly lessen the number of cases of chronic disease, and this treatment in the large majority of cases is essentially non-surgical.

A SIMPLIFIED TECHNIQUE IN TUBERCULIN ADMINISTRATION.¹

BY ELLIS BONIME, M.D.,

Adjunct Professor Immunotherapy Division of Surgical Department, New York Polyclinic Medical School and Hospital.

Owing to the wide spread of the infection with the tubercle bacillus, I have long been convinced that the value of such remedies as we have can be of little importance unless they can be placed in the hands of the intelligent general practitioner.

Again, if we are to possess an effective remedy, that remedy should be applicable to ambulatory patients, and administerable without the necessity of taking them from their employment. The medical profession is beginning to realize more and more forcibly that the vast number of patients suffering from tuberculosis have not yet come for diagnosis and assistance; that these, being undiscovered, offer the greatest danger to the community. Without such a remedy we cannot hope to attract these patients to seek aid in the early stages of the infection, for at present there exists a subconscious fear of a diagnosis of tuberculosis, based upon the fact that to most people such a diagnosis means a sacrifice of the employment which is the only source of support for the sufferer and his family. Indeed, I have known many to avoid diagnosis for no more plausible a reason than that they were unwilling to be separated from their favorite mode of life.

Accordingly, all such patients will nurse themselves into the belief that they are not tubercular; and do not approach the physician until driven there by considerable extension of their disease. It is therefore evident that with the prospect of a remedy that can be administered by the physician during periodic visits to his office, a vast number of patients will come for aid at the stage where aid is most efficacious.

Such a remedy may be found in tuberculin. It is no longer doubted anywhere that tuberculin possesses the power to elicit an immune response. And possessing this virtue, it must be recognized as the only

certain remedy in this infection. What then is it that has made the administration of tuberculin so dangerous and so difficult? We know that tuberculin *per se* is not poisonous, for it can be given to healthy individuals without producing constitutional symptoms; also if administered to an individual in the last stage of tuberculosis, in whom the immune response no longer exists, it produces no constitutional symptoms. It is therefore necessary for an immune response to occur before tuberculin can prove poisonous. It is not yet certain how this immune response produces the poison, but the most plausible and most generally accepted theoretical explanation is that the antibody in combination with the tubercle bacillus forms in itself the protein poison, or forms the poison as a by-product of the biochemical combination between the antibody and the tubercle bacillus.

Thus it is that the very protective mechanism in the tubercular infection produces a resultant poisonous product. This in its action produces the hypersusceptibility existing in tubercular individuals, which when increased by the production of this poison lowers the resistance to the infection. It thus allows the spread of disease during the period of the constitutional symptoms produced by the poison. This spread is such that it even more than offsets the amount of protection gained by the immune response. The amount of increased hypersusceptibility is in proportion to the amount of poison produced, which in its turn depends upon the number of tubercle bacilli killed during the immune response.

It is the difficulty in gauging the amount of immune response produced, so as to bring about a maximum effect with a minimum amount of resultant poison, that stands in the way of the general use of tuberculin, and which has limited its use to the present time very severely to the specialist.

¹Read before the New York County Medical Society, April 20, 1917.

Several schemes of dosage were devised in various parts of the world which proved very efficacious in the hands of the expert. However, all depended so much upon the judgment of the amount of hypersusceptibility of each individual case, that their favorable reports regarding the efficacy of tuberculin failed to place the remedy within the reach of the vast majority of the afflicted.

I have obtained my experience with tuberculin largely in ambulatory cases, and am convinced of its far-reaching effects if it could be administered with safety by the intelligent general practitioner. So I have endeavored to devise a simple method of tuberculin administration which retains the principal elements necessary for its therapeutic effect; and I have finally succeeded in elaborating the method that I am here to explain. Before going into details as to the technique, I wish to say a word or two about the choice of tuberculin and the method of making dilutions.

The scope of this paper does not permit of discussion as to the relative value of the various kinds of tuberculin. To my mind, the greatest value can be derived from long practice in the use of one tuberculin and making it applicable to exceptional cases, rather than endeavoring to find a tuberculin to fit each particular case. However, we must bear in mind that there are two varieties of tuberculin: the tuberculin containing the exotoxins as exemplified by Old Tuberculin, and the tuberculin containing the endotoxins as found in the bacillary bodies and as exemplified by Bacillary Emulsion. All others are either different strengths of either of these or are mixtures of the two in varying proportions. It seems that those elements causing focal reaction are more pronounced in the tuberculins, as represented by O. T., and are therefore better used for treatment in general. The tuberculins of which B. E. is a type seem to have a preponderance of antibody-producing substances, and hence would seem to produce greater constitutional reactions. It is therefore logical to use bacillary emulsion at the

conclusion of treatment when reactions are no longer to be feared, and where the bacillary immunity would seem to exert its greatest benefit.

In making dilutions, simplicity is the aim, since our purpose is to spread the use of tuberculin. I believe that the directions for making dilutions have been unnecessarily complicated and formed a prominent factor in limiting the use of tuberculin. Using as diluent one-half-per-cent phenol in normal saline, with the same tuberculin syringe that we use in treatment, we make five dilutions of the original tuberculin. In rare instances a sixth is necessary. Five small containers, labeled I, II, III, IV, and V, are sterilized ready to receive the dilutions.

By drawing 0.9 Cc. of the diluent into the syringe, followed by 0.1 Cc. of tuberculin, the first dilution is made and placed in the container marked I.

By drawing 0.9 Cc. of the diluent into the syringe, followed by 0.1 Cc. of dilution I, the second dilution is made and placed in the container marked II.

By drawing 0.9 Cc. of the diluent into the syringe, followed by 0.1 Cc. of dilution II, the third dilution is made and placed in the container marked III.

By drawing 0.9 Cc. of the diluent into the syringe, followed by 0.1 Cc. of dilution III, the fourth dilution is made and placed in the container marked IV.

By drawing 0.9 Cc. of the diluent into the syringe, followed by 0.1 Cc. of dilution IV, the fifth dilution is made and placed in the container marked V.

If a sixth is necessary, 0.9 Cc. of diluent plus 0.1 Cc. of the fifth dilution will make the sixth dilution. In that way:

Dilution No.	Strength of dilution.	Pure Tuberculin in each Cc. of dilution.
I contains 1 in	10 or 0.1 Cc.	or 100 c.mm.
II contains 1 in	100 or 0.01	or 10 c.mm.
III contains 1 in	1000 or 0.001	or 1 c.mm.
IV contains 1 in	10000 or 0.0001	or 0.1 c.mm.
V contains 1 in	100000 or 0.00001	or 0.01 c.mm.
VI contains 1 in	1000000 or 0.000001	or 0.001 c.mm.

Before going into a detailed description of the simplified technique for tuberculin administration, I wish to call attention to

the following principles involved in the physiological action of tuberculin:

1. In order to produce a sufficient immunity by successive immune responses, we must gain a tolerance for the protein poison for which the individual possesses a hypersusceptibility.

2. We must produce the maximum amount of immune response with each inoculation of tuberculin, falling short of the production of sufficient poison to cause a constitutional reaction.

3. To produce complete tolerance—in other words, to overcome the hypersusceptibility—we must keep within the maximum amount of tolerance of each individual by increasing the dose by an amount sufficient to offset the amount of tolerance gained by each previous dose.

4. To make certain that we are keeping within the maximum amount of tolerance during the treatment, a constitutional reaction must be produced at long intervals. If such reaction be mild, the clue it gives to the relation between dosage and the amount of tolerance will more than offset any temporary harm that it may produce.

5. Such a constitutional reaction, however mild, loses for the patient a certain amount of gained tolerance, and temporarily increases the hypersusceptibility, requiring a decrease in the following dose.

I have endeavored to incorporate these principles in this system of dosage. It begins with an amount of tuberculin less than will produce a reaction. This dose is subsequently increased by a definite but very small amount, and the amount of increase also increased by a very small amount and at regular intervals. The amount of dose increase is only sufficient to control the amount of tolerance gained by the preceding doses. And the amount of the increase of the increase will control the difference between the amount of tuberculin administered and the maximum amount the individual can tolerate. The progressively larger increase in the dose thus brought about will eventually produce a constitutional reaction. This reaction will neces-

sarily be mild, as it is produced by the smallest amount of tuberculin required to produce such a reaction in that individual. By increasing the intervals after such reaction, and decreasing the dose by a small amount (thus offsetting the decreased tolerance produced by the reaction), we are certain that we are using a quantity of tuberculin coinciding with the maximum of tolerance of the individual, or that dosage which alone will produce the ideal therapeutic effect.

This full therapeutic effect can be kept up with but a slight increase during the next few treatments—that is, it is sufficient to begin with the same amount of increase as at the beginning of treatment. And in order to make certain that we shall not fall behind with the maximum effect, we continue by increasing the increase in the same manner as before. A second and even a third reaction may thus be produced during a course of treatment; but since these reactions are necessarily mild, this constant keeping at the maximum level of tolerance which this method of dosage entails must produce a continued maximum therapeutic effect.

Tuberculin injections should be given twice weekly. The new increase may be made on the day following the longer of the two intervals that occur in the week. A local reaction persisting at the time when the next treatment is due should indicate a postponement of the next treatment—making the interval a week. However, if the local reaction still persists beyond a week, it need not be regarded as of further significance as far as the continuation of the treatment is concerned. In fact, a local reaction need not at any time indicate a lessening of the dose.

In concluding treatment it is advisable in a great many cases, especially in bone and joint disease, to produce a bacillary immunity before we discharge the patient; and we do so by inoculating with B. E. once a week, beginning with the first dilution and either administering it as No. I of O. T. is administered (see chart), or by increas-

THE SIMPLIFIED TECHNIQUE OF TUBERCULIN ADMINISTRATION.

Administration of O. T.

Date 1916	No. Sol.	Quant. Cc.	Reaction Loc.	Temp.
Jan. 1	1	V 0.10 ¹	0	0
5	2	0.12		+ 0.02
8	3	0.14		"
12	4	0.18		+ 0.04
15	5	0.22		"
19	6	0.28		+ 0.06
22	7	0.34		"
26	8	0.42		+ 0.08
29	9	0.50		"
Feb. 2	10	0.60		+ 0.10
5	11	0.70		"
9	12	0.82		+ 0.12
12	13	IV 0.10		"
16	14	0.12		+ 0.02
19	15	0.14		"
23	16	0.18		+ 0.04
26	17	0.22		"
Mar. 1	18	0.28		+ 0.06
4	19	0.34		"
8	20	0.42		+ 0.08
11	21	0.50		"
15	22	0.60		+ 0.10
18	23	0.70		"
22	24	0.82		+ 0.12
25	25	III 0.10		"
29	26	0.12		+ 0.02
Apr. 1	27	0.14		"
5	28	0.18		+ 0.04
8	29	0.22		"
12	30	0.28		+ 0.06
15	31	0.34		"
19	32	0.42		+ 0.08
22	33	0.50		"
26	34	0.60		+ 0.10
29	35	0.70		"
May 3	36	0.82		+ 0.12
6	37	II 0.10		"
10	38	0.12		+ 0.02
13	39	0.14		"
17	40	0.18		+ 0.04
20	41	0.22		"
24	42	0.28		+ 0.06
27	43	0.34		"
31	44	0.42		+ 0.08
June 3	45	0.50		"
7	46	0.60		+ 0.10
10	47	0.70		"
14	48	0.82		+ 0.12
17	49	I 0.10		"
21	50	0.12		+ 0.02
24	51	0.16		+ 0.04
28	52	0.22		+ 0.06
July 1	53	0.30		+ 0.08
5	54	0.40		+ 0.10
8	55	0.52		+ 0.12
12	56	0.66		+ 0.14
15	57	0.82		+ 0.16
19	58	O. T. 0.10		"
26	59	0.20		"

Double the dose one week after the final dose as a test. If a reaction occurs after this test, give No. I over again, beginning one week after the reaction.

*Feb. 19	15	IV 0.14	+++	0	+ 0.02
26	16	0.18	++	"	+ 0.04
Mar. 4	17	0.22	+	"	"
8	18	0.28	0	"	+ 0.06
11	19	0.34	"	"	"
15	20	0.42	++	101	+ 0.08
22	21	0.28	0	0	"
25	22	0.30	"	"	+ 0.02
29	23	0.32	"	"	"
Apr. 1	24	0.36	"	"	+ 0.04
etc.		etc.			etc.

B. E. Administration.

Administer B. E. after a completed course of O. T. by beginning with 0.10 Cc. of No. I dilution of B. E. (10% product which contains 5 mgr. per Cc.) and continuing with an increase of 0.10 Cc. at weekly intervals until a tenth Cc. of pure B. E. is reached. Then proceed by an increase of 0.02 Cc. of pure B. E. until a dose of 0.30 Cc. B. E. pure is reached.

†If reaction occurs after first dose, begin, after one week's interval, with the next dilution, in this case No. IV.
*Treatment after a local reaction without a constitutional reaction.

†Treatment following a constitutional reaction.

ing the dose by 0.1 Cc. until 0.20 Cc. of pure B. E. has been reached.

In tuberculosis, as in syphilis, it is difficult to determine just when the disease is totally eradicated. A negative complement fixation test of the blood in both syphilis and tuberculosis merely indicates a temporary excess of elements of resistance over the elements of disease. In syphilis the complement fixation test is applied at intervals for a period of time after an arbitrary conclusion of treatment in order to determine the possibility of a recurrence. It therefore occurred to me some years ago to apply the subcutaneous tuberculin test at three-month intervals following the conclusion of treatment for a possible return of hypersusceptibility. For experience has shown that hypersusceptibility precedes the recurrence of disease. The test consists of the inoculation of 0.01 Cc. of O. T. If that proves negative, a second test is administered a week later by giving 0.1 Cc. of O. T. If a constitutional reaction occurs after the first test, a course of tuberculin treatment is instituted, beginning with dilution II. If, however, the first test proves negative, and the second positive, the tuberculin treatment, beginning with dilution I, is instituted.

The overcoming of hypersusceptibility in tuberculosis may be the key-stone to the conquest of the disease. Since we have come to appreciate the wide spread of this disease, and the natural immunity that the human race possesses against it, I cannot but conclude that those who finally succumb to the disease are those who have acquired the idiosyncrasy to the protein poison, or the hypersusceptibility, as it is termed, after an initial infection. By the use of tuberculin we can both detect that hypersusceptibility, and overcome it before a recurrence of the disease can take place. So I venture to express the hope that by the wider use of tuberculin as rendered possible by its adoption into general practice, we shall add that element which will render the final eradication of this dread disease possible.

THE BARANY REACTION AS AN AID IN DIAGNOSIS AND TREATMENT.¹

BY FRANK R. STARKEY, M.D., DETROIT, MICHIGAN.

In bringing forward this subject I, of course, do not make any claims to originality, inasmuch as our knowledge of intracranial localization is by no means satisfactory, although von Monokow, Sherrington, Mills, Spiller, and others have to some degree pointed out to us the reasons for some of our errors in diagnosing the location of cerebral and cerebellar lesions. Their work has thrown doubt upon what we supposed to be our most fundamental truths concerning the upper motor pathway and has caused us to realize that our conceptions of what seemed to be most thoroughly proven facts must change in the light of progress. This work of these investigators is scarcely less disturbing than was the overthrow of our conceptions of what we supposed to be for all time settled, the indivisibility of the atom. Now, thanks to the Curies, we know the atom to be a highly complex body. Therefore, we should welcome any addition that may increase our precision in this direction and feel especially grateful to Barany. The fact that his researches have been deemed worthy the Nobel prize gives them an added dignity.

While we should not be stinting in our praise of Barany as a pathfinder, we must not forget that to the indefatigable work of Dr. Isaac Jones of Philadelphia, under the supervision of Drs. Charles K. Mills and William G. Spiller, we owe most of the exact knowledge that we now possess concerning the pathways by which we trace these vestibular phenomena and make them useful in localizing lesions.

The Barany reaction cannot by any means be considered infallible, but I believe that when fully understood and carefully worked out it will prove an additional link in our chain of diagnostic aids, which must be considered as we do the Wassermann and other modern tests, not singly but as a part of an entire complex, before we attempt to pass judgment.

Before accepting these findings we should make repeated examinations and should then not allow our enthusiasm to carry us astray, but always be conservative.

The Barany reaction is based upon certain fundamental facts that have been given us by the zoölogists in experiments with certain mollusks and crustacea, the clam and the lobster in particular. It has been proven and is easily demonstrable that the clam and the lobster depend for their sense of direction and position on certain small concretions located in their organ of hearing, which, upon movement, fall upon delicate filaments or cilia connected with the nervous apparatus. These concretions and cilia are very beautifully shown in dissections of the ear of the clam. And the lobster, upon shedding his shell, which he does periodically, shows these grains of sand, and if he is freed of them and placed in a tank of distilled water he has absolutely no sense of direction, and if turned upon his back he makes no effort to assume a normal position. The vestibular apparatus, including the semicircular canals, are the homologue in the human being of these simpler mechanisms in the clam and lobster.

The physiology of the cerebellum has received much attention by students of the nervous system from the time of Petit, about 1710, to the present time, but our knowledge is still very chaotic, especially pertaining to localization of cerebellar lesions. Many signs and symptoms have been advocated for this purpose by eminent men, while diametrically opposite results were arrived at by no less careful and authoritative observers. Before we can attempt to make any use of the Barany reaction in localization of lesions, it is first necessary to understand the relation of the cerebellum to the rest of the nervous system, which is accomplished by certain afferent and efferent paths that pass through the superior, middle, and inferior peduncles, respectively. The fibers of the superior peduncles arise for the most part in the

¹Read before Wayne County Medical Society, Detroit, January 15, 1917.

cells of the dentate nuclei, run forward to the mesencephalon, where most of them decussate beneath the corpora quadrigemina and terminate in the red nuclei. From the red nuclei fibers run to the optic thalami and are again relayed to the cortex. The superior peduncles also contain a few afferent fibers, according to Mingazzini, which probably arise in the thalami and pass through the red nuclei, decussating before reaching the superior cerebellar peduncles. The middle peduncles are mainly composed of afferent fibers to the cerebellum which arise in the cells of the pontine nuclei. They cross the median line of the pons and terminate in the cerebellar cortex of the opposite side. Since the cells of these crossed ponto-cerebellar fibers are in relation with the final ramifications of the fibers originating in the frontal and temporal cortices, it follows that each cerebral hemisphere is indirectly connected with the opposite half of the cerebellum by these fronto-temporo-pontine paths. According to Cajal, fibers from the Purkinje cells run through the middle peduncles, cross the pons, and then descend in the lateral column of the cord to terminate around the motor cells of the anterior horn. The inferior peduncles contain both afferent and efferent fibers, mainly afferent. Some fibers ascend from the cord and others from the medulla. They run in the lateral columns of the cord, forming the direct cerebellar tracts of Flechsig, which ascend through the restiform body to the vermis.

The technique of the Barany reaction or test is as follows: The turning test is performed by placing the patient in a smoothly revolving chair in which there is no vibration, and revolving it either to the right or left for, say, ten revolutions. In a normal individual with the head erect, this causes movement of the fluid in the horizontal canals, and if the head is inclined either forward or backward it produces a corresponding stimulation of the vertical canals. This stimulation of the semicircular canals produces through the nerve pathways to the

eye a nystagmus of about 26 seconds' duration with the slow component to the side that is stimulated.

The caloric test is applied by douching the ear with water at 68° F. for a period of about four minutes. If the head is erect the vertical canals are stimulated, and if the head is inclined forward or backward the horizontal canals are then brought into the vertical plane and are stimulated. This stimulation depends upon movement in the fluid in the canals due to the cooler upper stratum falling, much after the fashion of the circulation in a radiator, and the nystagmus is produced by stimulation passing from the ear through the posterior longitudinal bundle to the nuclei of the sixth and that portion of the third nerve that enervates the internal rectus. This causes a conjugate deviation of the eyes, which is converted into a nystagmus by impulses from the cerebrum, which restore the eye to its normal position. In a person in deep narcosis stimulation of the semicircular canals does not produce nystagmus, but a conjugate deviation, because the cerebral mechanism is eliminated by the anesthetic. The vertigo is produced by the stimulus from the ear passing through the cerebellum to the cerebrum. This causes a confusion resulting from the coming into consciousness of afferent and efferent impulses which are ordinarily integrated but become dissociated. The ear is the most important peripheral organ which sends such impulses efferentward, and any slight disturbance of the labyrinth results in confusion of the patient's conception of his position to space. The normal individual is aware of his position in space and can, without difficulty with his eyes closed, locate an object previously touched, as the examiner's finger held in front of him. When his ears are douched, however, or if he be turned in a smoothly revolving chair, he past points in a definite way. If cold water (68° F.) is used for douching the right ear, for instance, or if the patient is revolved to the right, he will past point to the right, and if hot water (112° F.) is used, or if the

patient is rotated to the left, he will past point to the left. The patient's head should be held in a fixed position during these pointing tests. These same reactions are true of the wrist, elbow, foot, head, and trunk.

It seems that the pathways by which the stimuli are carried from the vestibular apparatus through the cerebellum to the cerebrum are by way of the inferior cerebellar peduncles for the horizontal canals and the middle cerebellar peduncles for the vertical canals, and, after passing through the cerebellum, they reach the cerebrum by way of the superior cerebellar peduncles. Nystagmus upward is caused by neuraxial lesion, which interferes with passage of impulses from the vertical canals, and these interruptions are usually produced by tumors of the cerebello-pontine angle, internal hydrocephalus causing pressure on the floor of the fourth ventricle, or tumors in the cerebellum causing pressure on the pons. According to Mills and his colleagues, the fibers from the horizontal canals have separate pathways from those of the vertical. Those from the horizontal are confined to the medulla and enter the cerebellum through the inferior peduncle, while the fibers of the vertical canals ascend into the pons and enter the cerebellum through the middle peduncle.

In any attempts to interpret the findings obtained from the Barany tests, we must first bear in mind that each reaction is dependent upon a definite arc, and that it is interruptions in the impulses passing through these arcs that cause variations from the normal, and upon our interpretation of these variations the value of the Barany reaction depends. While it is not so easy or simple to demonstrate the intactness of these arcs as it is the better known reflexes, such as the knee-jerk for instance, they are probably no less definite.

Although the author of these reactions was an otologist, and some of the most important work on them has been done by another otologist, namely, Jones, and the work has been clasped to the bosom of the

otologists in general, I believe it to be more essentially the work of the neurologist than of the otologist and should be employed as part of our routine examination in all of our suspicious cases.

Since the above article was written my attention has been called by Dr. Emil Amberg to two articles of much historical value bearing on this subject, namely, "Labyrinth und Nystagmus," in *Archiv für Ohrenheilkunde*, by Dr. Martin Sugar, and "Otologischer Teil," in *Monatsschrift für Ohrenheilkunde und Laryngo-Rhinologie*, by Dr. Martin Sugar. These articles seem to prove that elaborate animal experiments were conducted by Dr. Andreas Högyes as far back as 1881, which established the true function of the labyrinth and semicircular canals in relation to equilibrium. This, however, does not detract from the practical value of Barany's work.

812 KRESGE BUILDING.

ACUTE MERCURY POISONING.

In the *Journal of Medical Research* for March, 1917, BURMEISTER and McNALLY reach these conclusions from experiments on animals:

1. Mercury can be detected chemically, frequently quantitatively, in the blood of animals poisoned with mercuric chloride, within a very few minutes after it is administered.

2. Degenerative changes, leading to individual cell death, take place rapidly in the kidney and occur simultaneously with the presence of mercury in the circulating blood.

3. In massive intoxication immediate renal changes vary with the size of the dose. Hepatic changes vary as the duration of the intoxication. In smaller doses renal changes vary as the duration of the intoxication.

4. The degree of renal or hepatic degeneration does not necessarily vary directly as does the amount of mercury contained in the circulating blood.

EDITORIAL.

HYPODERMOCLYSIS IN THE DIARRHEA OF CHILDREN.

It is scarcely more than twenty years since hypodermoclysis became generally known to the profession, and we think it is a fair statement that it is not so frequently resorted to for the relief of any type of case to-day as it was ten years after its introduction. This is due, in part, to the fact that its novelty has worn off, to the fact that certain contraindications, like dropsy or pulmonary edema, forbid its use, to the discomfort which it causes many patients, and, last of all, to the introduction of the Murphy drip, which, however uncomfortable it may be, nevertheless usually causes less annoyance than the injection of a considerable quantity of salt solution under the skin.

In infancy both hypodermoclysis and the Murphy drip are difficult to employ because of the restlessness of the child, and the struggle with the carrying out of either of these methods by the physician and nurse naturally brings forward the question as to exactly how advantageous its employment is. Whatever clinical observation may have shown in the past, nevertheless careful, scientific investigation, concerning the rapidity of the absorption of liquid, the absorption of the salts employed and the speed of their elimination, was needed to reach definite conclusions.

These conclusions have now been, at least in part, obtained by an investigation carried out by Holt, Courtney, and Fales concerning the excretion of the sodium chloride and the water when injected subcutaneously, the investigation having been carried out in the laboratory of the Babies' Hospital, of New York, and the Rockefeller Institute. Studying cases of diarrhea in infancy, they showed that there was a great loss of salts, especially the more soluble ones, and, noting a very definite gain in weight after the employment of hypodermoclysis, the question which presented itself was as to whether this was solely due to the increased liquid provided,

or to the retention of the salt. The method of injection was to use freshly distilled water, sterilized in the flask used for hypodermoclysis, this flask being fitted with a two-hole rubber stopper carrying short pieces of glass tubing, one of which was connected by a rubber tubing with an ordinary hypodermic needle. The flask was then heated to body temperature, hung at a suitable height above the patient, kept warm by being wrapped in a piece of cloth, and inverted so as to permit the flow. The needle was usually inserted in the back between the scapulæ, and held in place by strips of plaster. The salt solution used consisted at first of sodium chloride, 0.86; potassium chloride, 0.02; calcium chloride, 0.64 (including water of crystallization); and distilled water, 100 Cc. About 200 Cc. of the solution was generally employed, and one to three hours was required for its absorption, according to the degree to which the infant had been deprived of fluid by purgation. The rate of absorption varied greatly in different patients. In some it took place in four hours, in others not for twelve hours. Naturally the first injections were absorbed more promptly than the later ones. A slight reaction of one or two degrees of temperature often occurred.

After a certain amount of investigation the salt solution we have just named was given up and the ordinary salt solution, by which we presume is meant Ringer's solution as modified by Locke, was resorted to.

Holt and his collaborators found that protracted vomiting robbed the body of both fluid and salts, as did diarrhea, and that a considerable portion of the salt is usually retained for two or three days, sometimes for a longer period, the retention of the water following the retention of the salt. In normal children the greater portion of the water is apparently excreted in the course of the first twenty-four hours, and the salt often escapes in great part in the first six hours, which emphasizes the fact already known, namely, that the body

speedily eliminates salts for which it has no use, provided that the kidneys are not so impaired in function as to make this impossible, when many salts, notably potassium salts, otherwise innocuous, become hurtful.

ACETONURIA AND INANITION IN CHILDREN.

The readers of the GAZETTE will remember that from time to time we have considered rather fully the subject of acetonuria and acidosis, and that about a year ago we discussed the work of Howland and others in connection with the acidosis which develops in the summer diarrheas of infancy. It has become increasingly evident, and we think this has been made clear by previous summarizations of this subject, that there is a difference between acidosis, to use that term in a strictly accurate manner, and acetonuria, which represents a state in which there is an excessive formation of beta-hydroxybutyric acid, diacetic acid, and, finally, acetone itself. These bodies seem to be due to faulty metabolism of fats, whereas acidosis covers conditions arising from other causes possibly not so well understood and already discussed in these pages.

It has long been known that starvation induces acetonuria because the body begins to utilize its own tissues in order to obtain energy and heat after the deprivation of food, and a similar condition, of course, exists in the presence of the vomiting and purging of infantile diarrhea. For this reason it has been considered by Veeder and Johnston that it would be advantageous for us to gain some idea of the amount of the acetone bodies and acidosis in childhood resulting from an inanition not due to disease but to the deprivation of food. In five instances the period of starvation lasted twenty-four hours, in thirteen other cases it lasted forty-eight hours. A rapid increase in acetone elimination takes place in the second twenty-four hours, as might be expected. None of the children as a result of these brief periods of inanition

showed any of the clinical evidences of so-called acetonuria. There was no nausea, vomiting, flushing of the face, temperature variation, or labored breathing. Veeder and Johnston think that the absence of these symptoms in these experimental children indicates the formation of the acetone bodies can hardly be the fundamental cause of the symptoms so often regarded as due to acidosis. This view is substantiated by the fact that clinical observers have long thought that the symptoms of the summer diarrhea of infancy were not due so much to the presence of ketone bodies, formed as a result of vomiting and purging, as they have been due to the absorption from the alimentary canal of certain toxic substances primarily contained in the food, or developing in the food while in the alimentary canal, either because of putrefactive change or because of perverted digestive function.

It would seem evident that some of the symptoms manifested by children suffering from summer complaint may be due not only to poisons which they make from their tissues, but that the problem is really more complex and that two or more sources of intoxication are active factors to be considered in each case.

For this reason the use of carbohydrates and alkalies is not all-sufficient in the treatment of these states. Every clinician knows that the fats and proteins must also be eliminated from the diet.

THE TOXIC EFFECT OF EMETINE HYDROCHLORIDE.

We have so often called attention in these pages to the fact that any drug which is powerful enough to do good will, if wrongly used, also be powerful enough to do harm, that we hesitate to reiterate this truism in therapeutics; nevertheless it is a fact which cannot be too carefully borne in mind, since it is intimately associated with the question of proper dosage, and this, in turn, is essential if excellent results from medication are to be obtained.

Emetine hydrochloride is so commonly employed in medicine to-day that many of

us are prone to forget that ten years ago it was regarded rather as a pharmaceutical or chemical curiosity, and no one thought of employing it as a curative agent, much less one that possessed definite physiological and parasitocidal power. With the discovery that it was a specific agent for the treatment of entamebic dysentery its popularity became wide-spread, and undoubtedly many cases of dysentery that were not amebic have been treated by it without good results, for the very obvious reason that it is ineffective in the dysentery which is due to the bacillus of Shiga and other microorganisms than the entameba.

It is natural, under these circumstances, that a number of papers should have appeared in Europe and in this country emphasizing these facts and also the fact that it is toxic. One of these papers, by Johnson and Murphy, of the U. S. Army, is published in the *Military Surgeon* for January, 1917, in which they report the death of two men, under treatment for entamebic dysentery, who died from peculiar and unusual conditions in no way associated with the disease from which they suffered, and also five cases which showed physical signs and symptoms which led them to believe that emetine was responsible therefor. They also quote a considerable amount of literature, American and English, in regard to the toxic effect of this substance. In one of the fatal cases one-third of a grain of emetine was administered three times a day from August 21 to August 24. It was repeated from September 5 to September 15; and, again, from September 27 to October 3 in one-half-grain dose once a day. The patient after this was found to have a rapid pulse, motor weakness, and great nervousness, with a very low blood-pressure, the pulse later becoming irregular, the rate rising as high as 162 and the respiration 42. The lungs showed evidences of congestion, and there was cough with some expectoration. On October 5 there was a foul diphtheritic odor to the breath and the throat showed a pustular exudate on the posterior wall. The tongue was red, beefy, dry, and fissured. The temperature was

101.6°. Death took place on that date. In still another instance symptoms of a somewhat similar nature developed, except that motor weakness and difficulty in swallowing and in retaining food seemed to be more marked symptoms. In this instance one-half-grain doses were given twice daily for twelve and a half days, in the first course of treatment; one-half grain daily for fourteen days in the second course; and one-half-grain dose daily in the third course. In this instance, too, the drug was stopped on account of excessive nervousness. The patient was stimulated, but his weakness increased, and he died apparently of acute dilatation of the heart.

It would seem probable from this and other papers, therefore, that emetine has to be used with some care, particularly if the patients are already weakened by disease. The method which these surgeons advise is the use of one-third grain once a day, increasing by one-third each day until one grain is given per diem, and this is continued until a total of eight grains has been administered altogether. This treatment is accompanied by large doses of bismuth subnitrate, and during the next ten days colonic irrigations of 1:1000 quinine solution once or twice a day. If the stool still shows ameba one grain of emetine is given hypodermically for three days. This method has been found efficacious in making the stools sterile and free not only from entameba but also from cysts. Sometimes the patient requires a third course.

THE TREATMENT OF SYPHILIS.

The introduction of salvarsan into medicine was an epoch-making advance in therapeutics. It was the most scientifically constructed medicament known to man, and the manner of its development established the basis for the new science of chemotherapy. Its superior value in syphilis and in certain other diseases, such as yaws, relapsing fever, tertian malaria, etc., are all well attested. The elaboration of salvarsan (this trade name is meant to refer to dioxy-diaminoarsenobenzol, no matter by whom

prepared) is most complicated and difficult: it must pass through many intermediate stages. The purity of these intermediate products will of necessity influence the purity of the final compound. Salvarsan cannot be purified by repeated crystallization. It is quite possible, therefore, that traces of various impurities may be present in the final product: as a matter of fact we know, from ultimate analysis, that such is the case, and furthermore, that in the present state of our knowledge this cannot be entirely avoided. Inasmuch as absolute chemical purity is not obtained we cannot expect absolute constancy in biological effects. Depending upon the character and quantity of impurities, there will be variations in toxicity, and to a lesser degree in therapeutic effect.

It is important to recognize that the toxicity of salvarsan varies, for such knowledge is essential to safe clinical guidance. In the light of this knowledge it is not justifiable to give large daily administrations of salvarsan or neosalvarsan for a number of days, as a few experienced clinicians have advocated. With products of low toxicity this might be done without danger, but without possession of the laboratory records of the product employed, a distinct hazard is encountered by such heroic methods of treatment.

No one is in a position at the present day to set down a prescribed formula as to the most approved and perfect method of treating syphilis. Some years ago, before the advent of the Wassermann test, we laid down, in the plenitude of our ignorance, a routine treatment of syphilis. So much depends, nowadays, upon the stage in which the patient presents himself for treatment.

In the primary stage, abortive cures can often be achieved. The later the patient comes under vigorous treatment the greater is the opportunity for wide-spread diffusion of the spirochætæ. These may find their way into the tissues and may then become relatively inaccessible to therapeutic agents. No two cases of syphilis are identical, by reason of the fact that the quantitative infection, the defensive power of the body

cells and fluids, and the topographic distribution of the parasites will vary. In one patient the disease may induce severe and fatal symptoms, while in another the parasites may after a time take on almost a saprophytic existence, and the patient may live to old age in average health. Syphilis is veritably a disease of paradoxes.

There are many cases in which it is impossible to secure a negative Wassermann by the most vigorous therapeutic measures. This may be due to the anatomical inaccessibility of the spirochætæ or perhaps to the fact that they have gone into a resistant resting stage. I believe that where cures cannot be achieved the disease, if not advanced, may be arrested and robbed of its terrors by adequate treatment. The question may pertinently be asked, What constitutes adequate treatment?

In an early case the ideal treatment would be weekly intravenous injections of salvarsan for ten or twelve weeks. If the injections are borne well and there is no reaction, the early treatments might be given at intervals of five days. If the patient loses vigor or develops headaches or digestive disturbances, the injections should be interrupted, and after a brief rest mercury should be used.

The insoluble mercurial compounds are efficient, but the dose must be guarded and the kidneys watched, as all insoluble mercurial injections cause an accumulation of the drug in the muscles. The safest method of using large doses of mercury is by inunction. It is rather remarkable that the medical profession has been using inunctions for almost 400 years and has repeatedly attested the merits of this method, but has slighted it because the method was dirty. Such is the force of medical tradition that we have adhered to a dirty mercurial instead of seeking a clean one. Calomel rubs into the skin more easily than mercurial ointment and is absolutely cleanly. We have demonstrated its absorption by laboratory studies. Thirty or forty grains in 10 grains of lanolin and thirty grains of lard should be rubbed in daily.

In conclusion we emphasize the statement

that the patient must be treated as well as the disease. The Wassermann reaction will sometimes improve under freedom from specific treatment and resort to general invigorating measures.

THE EVALUATION OF TRAUMA.

In these days of workmen's compensation and the claims resulting therefrom, it is natural that the man whose whole capital is his bodily strength may often quite honestly attribute any of the ills from which he suffers to trauma, for which he can always recover damages. This is particularly so regarding hernia, because through generations it has been regarded as an affliction always caused by strain. The philosophic discussion of the question by Fay (*Surgery, Gynecology and Obstetrics*, February, 1917) is therefore of considerable value. Though the term traumatic hernia is well recognized by the profession as designating a rupture directly or indirectly due to local injury, this term has often been applied to any hernia developing while its bearer is at work, even when relaxed fascia and enlarged rings could readily be demonstrated. The true traumatic hernia is usually recognized as such, nor is there any question concerning it. What Fay calls the industrial hernia is that about which there are so many contests. In these hernias there is no external sign of violence, but the bearer insists, and usually believes, that the lesion was due to a blow, fall, twist, heavy lifting, overstraining, or indirect violence. Brandenburg reports on the examination of nearly 4000 workmen, employed in digging the St. Gothard tunnel, and says that over 80 per cent exhibited a predisposition to hernia—i.e., the external ring admitted the tip of the index-finger; whilst Schwiening as the result of an examination of about one million healthy young men examined for military service in Germany observed that 16 per cent had hernias. Zollinger reported on nearly 5000 examinations, over 40 per cent showing a slight tendency to hernia. Autopsies on 200 men, who during life had

shown no signs of hernia, proved to Murray that 34 per cent had a so-well-defined peritoneal bulge as to justify the term "sacculated hernia."

Berger notes that of 117 who attributed their hernia to trauma, 86 had other hernias of whose existence they were ignorant. Of the cases of supposed traumatic hernia referred to the chief insurance referee from the lower insurance tribunals of Germany in 1905, only 2 per cent were declared to be in reality traumatic; although in recent years a more liberal tendency has been observed, the percentage having risen to 5, 6, and even 7 per cent.

Akerman, an authority on compensation in Sweden, says that in eight years he has had only 170 cases of traumatic hernia, and that after operation 40 of these were rejected. There are 4000 operations annually for hernia in Sweden. In France in order that a hernia be adjudged traumatic, the national insurance bureau demands that there shall have been a direct contusion of the inguinal region, or that the work being done shall have required more than usual exertion. The injured man must have been forced to stop work immediately following the accident. He must have been forced to seek medical attention at once, or at most by the evening of the following day.

Brouardel says that the following points must be given consideration:

When a traumatic hernia first appears it is always of small volume. If the volume of a hernia exceeds that of an egg, one may be sure that the hernia antedated the accident. In the majority of cases a traumatic hernia is unilateral; bilateral hernias, or a unilateral hernia with a markedly enlarged ring on the other side, are strongly suggestive of hernia disease. If the inguinal canal is little more than an orifice, and the finger, introduced into it, enters the abdomen, the inner wall of the canal is weak, and the idea of a traumatic origin may be rejected. In traumatic hernia the inguinal ring is small, hardly admitting the tip of the index-finger; the introduction of the finger causes pain. The presence of an ectopic testicle speaks strongly against the traumatic origin of a

hernia; an ecchymosis is suggestive of such an origin. Marked obesity and emaciation alike weaken the abdominal walls, and are to be considered as predisposing to hernia. Moreover, when an inguinal canal is short and broad, its course only slightly diagonal, the hernia is probably an old one.

It is held by the law that a workman is entitled to compensation if an accident is shown to have been the immediate cause of hernia, since if it had not been for this accident, even though there were predisposing conditions, the hernia would not have developed. For practical compensation purposes then any hernia is considered traumatic when it is proved that the injury was the immediate, though not the sole, cause of the hernia. It must be admitted that the absence of pain and the ability to continue work are hardly compatible with the idea of traumatic hernia. It must be borne in mind, however, that there are wide variations in the individual susceptibility to pain, and that a workman with steady nerves and a strong will might continue to work under conditions which would completely overcome a fellow workman, or might postpone a visit to his physician for some days unless the hernia should become strangulated.

An industrial hernia is undoubtedly always small when it first appears, and hence there is no injustice in estimating its maximum early size as that of an egg. Fay holds, however, that it is not safe to say that in traumatic hernia the hernial ring is always small, barely admitting the tip of the index-finger; any condition present in four-fifths of the men examined cannot be considered abnormal, nor can there be any hard and fast rule concerning the size of an inguinal ring. It is said that the majority of cases adjudged traumatic and granted compensation in Germany are those in which the hernia was strangulated when it first appeared. Cases in which strangulation does not occur but are difficult of reduction, when once reduced do not come down again.

The indications for operation in industrial hernia are in general far broader than in private practice. Practically all of these

hernias occur in men who are performing hard manual labor, and the inconvenience and the danger of strangulation are accordingly increased. Every probable industrial hernia should be entitled to operation and a reasonable time allowance given for recuperation. In the majority of cases this should be the only compensation allowed. In recent traumatic hernia the hernial sac is smooth and thin, and is not adherent to cord or ring. An adherent sac, a large inguinal ring with broad margins, a short, broad inguinal canal, a patent tunica vaginalis, a thickened sac, a large hernia or one that comes down and returns with a simple change of position—all these characterize the old hernia.

This analysis of the medicolegal aspect of hernia seems entirely rational; still more so if such hernias develop in the course of work, and if the employee on entrance into service has submitted to a thoroughly competent careful examination. To those who see many of these cases it is well known that the hernia may develop somewhat insidiously with pain not sufficiently severe to particularly attract the patient's attention; indeed, a discovery of a lump by sight or touch may be the first sign, and this may occur in those who exhibit no anatomical conformation which would suggest the probability of such an occurrence. It is also true that when there is a hernia, and one of comparatively large size, it may be caused by a single turn, twist, wrench, or heavy lift. Under such circumstances there is always a predisposing condition—i.e., a patulous tunica vaginalis—and it is these hernias which are particularly liable to strangulation.

The enormous recent-day increase in the number of hernia operations is due to the fact that all large industrial establishments refuse to accept a man who exhibits either a rupture or a condition strongly predisposing to its formation. Hence the majority of workers come not for the relief of their present symptoms, but for the removal of an obstacle to obtaining employment. The high percentage of radical cures is shown by the few operations for recurrence.

BLOOD TRANSFUSION.

Blood transfusion, of perennial interest, supposed to have been discussed and put to practical use among the ancient Egyptians, and, according to Eisenbrey (*Cleveland Medical Journal*, March, 1917), sufficiently well studied in 1492 to have suggested its application for the cure of the then Pope, could necessarily have been applied widely only in recent times, since for success surgical cleanliness is needful, provision must be made against coagulation of blood, and the blood of the donor must not be hemolytic to that of the receiver.

Concerning these points and methods Eisenbrey points out that the use of syringe and cannula is old, and that even in the early part of the eighteenth century the use of dissimilar bloods, i.e., animal's to man's, was recognized as unsatisfactory.

Following a period when vessel-to-vessel suture was employed, open to obvious objections, not the least of which was the uncertainty of dosage, there came an era when the indirect methods were universally applied, the blood being administered by syringe; from paraffin receptacle; or mixed with an anticoagulant. Lindeman used large glass and metal syringes, with which he withdrew blood from the donor and injected it into the patient through cannulæ inserted into the veins of each, the syringes being thoroughly cleansed between each filling and emptying. Unger simplified this technique by interposing a two-way stop-cock between the cannulæ in patient and donor in such a way that with one syringe it is possible to withdraw and inject the blood without having to detach the syringe or apparatus, clotting being prevented by keeping an ether spray playing on the syringe. It has been found that a .2-per-cent mixture of sodium citrate and blood prevents clotting and is non-toxic, as much as 5 grammes of a sodium citrate being tolerated. This is more than twice the quantity required to prevent clotting in a liter of blood.

Eisenbrey holds that the points to be considered in choosing a method for personal

use are simplicity, ease, and certainty of application, control of amount and rate of introduction, freedom from the danger of sepsis, clotting, or the introduction of air or other emboli, and the least amount of operative disturbance in both patient and donor. He prefers, as the most sure and safe way, the syringe method with the two-way stop-cock.

As to the agglutinative and hemolytic reactions which account for the fatal accidents when transfusions are performed without having first tested out the blood of donor and patient, while it is true that incompatibilities are found in a very small percentage of cases, they furnish the chief cause of death in transfusion. Such accidents are entirely preventable. It exceptionally occurs that in case of acute hemorrhage in a healthy individual transfusion becomes an emergency measure and allows of no time for blood testing. Under such circumstances the use of the blood of a relative adds a factor of safety to the procedure. As to the test of incompatibility, Eisenbrey believes the actual standard cross tests between washed cells of patient and serum of donor, and the reverse of this, constitute the most reliable safeguard against accident. These tests may be completed and interpreted in three hours. When subsequent transfusions are done it is doubly essential to have the tests made whether there was or was not any suggestive incompatibility in any of the donors tried before the first transfusion. If the second transfusion be made from the same donor used in the first the necessity for preliminary tests is all the greater. Eisenbrey states that he has had 48 donors tried out for a single patient before a satisfactory one was obtained; nor is blood relationship a guarantee of compatibility.

Transfusion is a specific for rapid, copious hemorrhage; nor must the amount injected equal that lost. The whole blood very promptly brings the volume of the circulating blood to an efficient degree even though the amount introduced is comparatively small. In hemorrhage of long duration and small amounts the immediate

effects are not so pronounced. The transfusion may accomplish in a few days what other measures have failed in after weeks of use. Transfused blood is not only mechanically helpful, but has a nutritive value and increases red cells, is hemostatic, hemopoietic, antitoxic, and antibactericidal. Simple anemias both of acute and chronic type benefit by transfusion. In the toxic or septic types the help is but transitory. In the purpuras transfusion varies in helpfulness. The severe hemorrhage of hemophilia is almost at once checked, though recurrence is not prevented. In melena neonatorum transfusion is a specific. It is apparently more effective than subcutaneous injection of human serum or whole blood.

The site indicated in infants is the longitudinal sinus; a small cannula being introduced into the sinus through the anterior fontanel. The external jugular vein is also practicable. In infants transfusion has a very limited usefulness as a curative agent, though it produces always a temporary increment of vitality. In various asthenic conditions it is helpful, particularly in delicate babies.

The average transfusion is from 500 to 700 Cc. Damage can be done by overload-

ing weakened circulatory apparatus. At times repeated small transfusions are better than one large one. A watch must be kept on the patient during transfusion for respiratory, vascular, and cardiac signs of embarrassed circulation. When less than 800 Cc. is used there is no temperature or untoward reaction. There is usually no difficulty in obtaining healthy donors, nor do these people object at all if the syringe-cannula method is employed.

This somewhat enthusiastic laudation of transfusion has its merits as bringing again before the profession a method of treatment of assured value in hemorrhage and illuminating-gas poisoning; of possible value in shock and of probable value in many chronic conditions attended by anemia. The needling and syringe method offers a procedure so simple that its frequent repetition is open to no objection on the part of the patient. The immediate effect of such transfusion, even when comparatively small quantities of blood are used, is surprisingly good. When one realizes the possibility of incompatibility between blood of donor and recipient the number of accidents occurring in cases in which no preliminary blood studies have been made is astonishingly few.

REPORTS ON THERAPEUTIC PROGRESS.

COMMUNICABILITY OF POLIOMYELITIS.

Writing on this subject in the *Archives of Pediatrics* for January, 1917, KERLEY reports some cases and states that every man may draw his own conclusions from his results. The following seem reasonable:

1. That poliomyelitis may be communicated through personal contact.
2. That there are innocent carriers who spread poliomyelitis.
3. That but a small percentage of children are susceptible to poliomyelitis. Schick has shown, in the use of the test bearing his name, that among 747 children under fifteen years of age but 34.9 per cent were susceptible to diphtheria. The susceptibility

of children to poliomyelitis is much less than the susceptibility to diphtheria. Probably from 90 to 95 per cent possess an immunity.

THE TREATMENT OF BURNS BY PARAFFIN.

In the *British Medical Journal* of January 13, 1917, HULL reminds us that Barthe de Sandfort introduced a treatment for burns by means of a preparation of paraffin which he called ambrine. The treatment consisted in washing the burns with sterile water, drying, and painting or spraying a layer of ambrine over the surface. The surface was then covered with a thin layer of wool, and a second coat of paraffin ap-

plied. The paraffin solidifies almost instantaneously, and a thick layer of wool and a bandage are then applied. The paraffin preparation, ambrine, is a secret one, and the property of the Ambrine Company, Paris.

Observations of de Sandfort's treatment, and experiments with ambrine, carried out in a military hospital, gave one the impression that the treatment was valuable. Burns healed with rapidity; constitutional symptoms rapidly abated; pain was reduced to a minimum; scarring appeared to be obviated, or at any rate was not apparent. The need for grafting large burns appeared to be avoided. The burns healed so rapidly with healthy granulations that there appeared to be nothing gained by grafting. The patients were singularly free from sepsis. The conclusion arrived at from experimenting with the ambrine treatment was that mild burns healed with singular rapidity, and severe cases recovered which would have been unlikely to recover by the ordinary methods of treatment. Observers who had had large experience of burns treated by picric acid, ointments, and other methods in ordinary use, were unanimously of opinion that the paraffin method was superior to the older methods. The experience of those who had witnessed the results of burns after liquid-fire attacks was that the ambrine treatment would save many lives, and accelerate the recovery of all burns.

A preparation resembling ambrine may be produced by impregnating hard paraffin with a small quantity of tar. The substance is not in very good solution, and falls to the bottom of the paraffin when the wax is heated. The excellent results obtained would therefore appear to be due to mechanical causes. The protection of the burn from the air, the protection of the newly-formed granulations from damage, and the splint-like effect of the wax in holding the damaged tissue immobile and at rest, appear to be the attributes which produce the effect. The heat of the applications and the conservations of heat to the surface may encourage the lymph flow, determine the supply of blood to the new capillaries, and

favorably affect healing. The relief from pain and the rapidity of healing is due to the fact that the burn is held at rest in a plaster-like cast of paraffin, and a suitable nidus in which the epithelium will proliferate is provided.

The absence of scarring depends upon the fact that skin can be reproduced in two ways. First, by direct proliferation of the epithelium in the depth of the wound. This method of healing is only possible in wounds of the first and second degrees, which form the vast majority of all cases of burns coming under treatment. Secondly, by the extension of the epithelium from the edge of the wound in cases of burns of the third and deeper degree. These burns are comparatively rare, and are the only cases suitable for grafting. The effect of the paraffin in the first class is to protect and stimulate the growth of epithelium, islets of which can be seen growing over the base of the burn. In the second class the epithelium spreading from the edge is protected and stimulated.

The first point to be determined was whether equally good results could be obtained with commercial paraffin, section wax, or similar pure hard paraffin. The ambrine preparation has peculiar and valuable mechanical properties. It has a lower melting point than ordinary section wax, is much more plastic when cooling, and has not the tendency to crack which ordinary hard paraffin has. It also adheres well to the skin and is not liable to slip after a dressing is applied.

Hard paraffin is not a suitable application in its raw state; it lacks the mechanical properties of ambrine; there is an absence of the flexibility and adhesiveness which ambrine possesses. Hull has found that if hard paraffin of suitable melting point be subjected to a temperature of 130° C. by means of superheated steam, the melting point was reduced about 2° C., and the hard paraffin now possessed the mechanical properties of ambrine. The therapeutic value of ambrine appears to be entirely mechanical, and Hull suggests that the processes of impregnation with tar or other

substances are associated with the application of superheated steam, and that it is this superheated steam that is the essential process in its manufacture. The clinical results of the application of hard paraffin—treated with superheated steam—to burns appear to him to be indistinguishable from those of ambrine.

Better results are obtained by the addition of certain antiseptic and stimulating substances. The wounds become clean more rapidly, pain is decreased, and the offensive smell associated with ambrine dressings is avoided, and the burns heal more quickly. It was found necessary to change the treatment of sluggishly-healing burns by ambrine to a paraffin containing an antiseptic. The change was always beneficial. The argument that an antiseptic will destroy the saprophytic action of the bacteria and will retard the treatment has not been borne out by clinical experience.

It is unnecessary to describe in detail the various experimental preparations. Laboratory experiments were made with a view to impregnating paraffin with various antiseptic substances—resin, essential oils, and tars. Experiments were made in order to produce a paraffin possessing the requisite melting point, plasticity, and adhesiveness. Cases were treated in the burn wards with various experimental preparations. Tar preparations were at first used; paraffin impregnated with oil of eucalyptus proved more efficacious. In order to obtain a painless treatment experiments were made with paraffin preparations containing analgesic substances. Potassium sulphate was used in one successful preparation (No. 4 paraffin), but was discarded as unnecessary in later preparations. After progressively improved results, a paraffin was finally arrived at having the mechanical properties of ambrine and containing a small amount of antiseptic. This is now in routine use known as No. 7 paraffin.

The results obtained by the use of No. 7 paraffin have surpassed the results obtained by ambrine or any other tried preparation. Severe burns of the third degree, accompanied by sloughing, and in a very septic

condition, have cleaned and taken on healthy repair under this treatment, after a trial of the ambrine treatment. Severe burns of both palmar and dorsal surfaces of the hands, extending to the tendon sheaths, have healed in three weeks without contracting cicatrices. Extensive burns of the flexor surfaces of the limbs, the regions most likely to be altered by contracting cicatrices, have healed without apparent scarring. Burns of the face heal with a new healthy skin without scarring.

Severe burns due to cordite, petrol, and liquid fire have been healed with this preparation; there have been no untoward results.

Patients who have been admitted with septic burns of extensive areas have rapidly recovered from constitutional symptoms, the temperature usually becoming normal in a few days.

The treatment is practically painless, and patients rarely complain of pain after the first application. It has never been found in the least necessary to give an anesthetic for the first or subsequent dressings. The rapidity of healing, the absence of sepsis or pain, the healthy new skin resulting, without contractile cicatrices or deformity, have been really remarkable. Burns become clean more rapidly than under ambrine treatment. Sloughs of deep tissues, in some cases down to bone, readily separate, and the burns become clean.

The paraffin treatment is begun at the first dressing; very exceptionally, in very septic burns, the paraffin is replaced by hot boric fomentations for two days after two days of paraffin treatment.

The burn is washed with sterile water and dried. The drying is accomplished by placing a dry piece of gauze over the burn. An electric drying apparatus, such as is used by a hairdresser for drying hair, if available, is a convenient method of drying the burn.

The burn is next covered with a layer of paraffin at a temperature of 50° C. The No. 7 paraffin has a melting point of 48° C. The temperature may be estimated by waiting until the wax shows a solidifying film

upon the surface. A broad camel's-hair brush, sterilized in wax, has been found to be a rapid and painless method of applying the paraffin. A spray may be used, but sprays readily get out of order, are troublesome to use, and the dressing takes longer. In theory a spray should be used in order to prevent any damage to the epithelium. In practice we have found a brush, skilfully used, sufficiently satisfactory. Sprays are indicated in very painful cases. A metal spray of rather large bore should be employed. The spray must be immersed in hot water during use.

A thin layer of cotton-wool, cut the same size as the area of the burn, is placed over the wound after the first layer of paraffin has been applied. This layer of wool is covered with a second layer of paraffin. The wool is cut in thin sheets and pressed between layers of paper in order to obtain thin layers of wool. The dressing is completed by applying wool and bandage. The burns are usually dressed later. In the later stages, when the burn is clean and only a small amount of pus is formed, the dressing is changed every forty-eight hours.

Blisters are not interfered with in any way at the first dressing; the paraffin is applied after washing the burn. At the second dressing the dead layers of skin are cut away. Sloughs usually separate after a few dressings. The separation of sloughs is accelerated by applying a layer of jaconet over the wool and paraffin beneath the wool and bandage dressing.

Formula for No. 7 Paraffin.

Resorcin	1 per cent.
Eucalyptus oil	2 per cent.
Olive oil	5 per cent.
Paraffin molle	25 per cent.
Paraffin durum	67 per cent.

Melt the paraffin durum, and add paraffin molle and olive oil. Dissolve the resorcin in absolute alcohol (soluble 2 in 1), add the alcoholic resorcin, and lastly add the eucalyptus oil when the wax has cooled to about 55° C.

A smaller amount of resorcin may be used. The whole of the resorcin does not remain in suspension, and we have used a paraffin containing 0.25-per-cent resorcin with good results.

Difficulty having been experienced in ob-

taining resorcin in large quantity, beta-naphthol, which has the additional advantage of being a cheaper antiseptic, has been substituted for resorcin in more recent preparations, as follows:

Beta-naphthol	0.25 per cent.
Eucalyptus	2.0 per cent.
Olive oil	5.0 per cent.
Paraffin molle	25.0 per cent.
Paraffin durum	67.75 per cent.

Hull has employed No. 7 paraffin in certain stages of the treatment of trench feet. The mode of application of paraffin to the ulceration following frost-bite is in every respect similar to the application of paraffin in the treatment of burns, and the results have been equally satisfactory.

DISAPPEARANCE OF MALIGNANT TERTIAN CRESCENTS FROM THE BLOOD FOLLOWING THE INTRAVENOUS INJECTION OF TARTAR EMETIC.

In the *British Medical Journal* of January 6, 1917, ROGERS points out that although the discovery of the value of cinchona and quinine in malaria has been of incalculable value, nevertheless even quinine is not an ideal drug for the disease, because although it rapidly kills the intracorpuseular stage of the parasite and brings about the cessation of the febrile paroxysms, yet it completely fails to destroy the extracorpuseular cycle, which is responsible both for the frequent relapses of the ague, and, still more important, for the infection of mosquitoes, and through them of other persons. The difficulty in completely eradicating a malarial infection is well known. Thus Norman Chevers relates that he suffered from attacks for eighteen years in India after contracting the disease in Chittagong, and for six years more after he returned to England, and that his friend, Sir Ranald Martin, had frequent attacks of ague throughout his long Indian service, and for no less than thirty years more in England, although both of them took quinine freely for the attacks. Prolonged daily doses of quinine for months at a time will often prevent relapses, but even this measure may

fail. A drug which will really cure malaria and destroy the infective extracorporeal stage of the parasite is, therefore, still much to be desired.

The uniform success which Rogers has already reported in the cure of kala-azar by tartar emetic intravenously, now amounting to over twenty consecutive cases in Europeans, led him to hope that the drug, once it is able to kill the Leishman-Donovan parasites, which are so highly resistant to quinine, might possibly also be inimical to the quinine-resisting stages of the malarial parasites, of which the malignant tertian crescents are the most characteristic. It is well known that once they appear in the blood they remain present for months on end quite uninfluenced by quinine. He has recently had an opportunity of testing the effect of the drug in two cases showing numerous crescents in the blood. Unfortunately it was not possible to follow up one patient, as he has left Calcutta in his ship. The rapid disappearance of the crescents from his peripheral blood was most encouraging, but Rogers realized that it would not be safe to draw far-reaching conclusions from a single case. Fortunately a second one soon presented itself.

A European male, aged forty-five, admitted for fever of ten days' duration accompanied by rigors. Very numerous ring malignant tertian parasites were found, several in every field of the microscope.

The rise of temperature to 104.8° on the evening after the injection of 8 cg. tartar emetic, followed by a very great reduction in the crescents in the peripheral blood, is very significant, in view of the fact that similar rises occur in kala-azar after the injections only as long as parasites are present, for such reactions are best explained as due to the liberation of toxins from the parasites destroyed by the drug. This view is supported by the fact that no ring intracorporeal forms of the malignant tertian parasites were found during the time the crescents were present which could account for the febrile reaction.

Here we have a second case in which recently developed crescents rapidly disap-

peared from the peripheral blood following the intravenous injection of a single 8 cg. dose of tartar emetic. Two such consecutive cases are very unlikely to be an accidental phenomenon. The dose used in the last case is less than half what has been safely given repeatedly in kala-azar cases.

The following experiences of the use of tartar emetic in benign tertian malaria are also of interest. Early in September last an Indian boy was admitted to Rogers' kala-azar ward. He found very numerous benign tertian malarial parasites in his blood. Although Rogers recognized the presence of a rather serious infection he decided to try tartar emetic, and gave 4 cg. intravenously in a 2-per-cent solution, the strength used in all the cases mentioned in this paper. His temperature had varied during the previous three days from 98° in the morning to from 101° to 102° F. in the evening, but on the evening of the day on which the tartar emetic was given it rose to 104° , showing a strong reaction. On the following day very few benign tertian parasites could be found. Two days after the first injection the same dose was repeated. On that morning only one parasite was found, and none on the next day or on several other occasions during the next few weeks. As low fever persisted when Rogers saw the patient again, after an interval of three weeks, he did a spleen puncture and found Leishman-Donovan bodies, showing the case to be a mixed infection—a rare condition in Calcutta. As the boy objected to further injections he was given antimony ointment inunctions. He gained weight steadily, and has had no rise of temperature to above 100° F. during the last month. However, on making a recent examination of his blood Rogers found one ring and one extracorporeal benign tertian parasite, thus showing that the two comparatively small doses of tartar emetic had failed to eradicate his malaria completely, and suggesting caution in expecting too much from such a short course of treatment. A 4-cg. dose was now given, and the parasite had disappeared again by the next day. He has had no quinine dur-

ing the two months he has been in the hospital.

Captain Hume has tried tartar emetic injections in two other cases of benign tertian malaria. In one man it required three doses of 4, 8, and 10 cg. to stop the paroxysms of fever and to cause the malarial parasites to disappear from the peripheral blood, so that in this case the drug appeared to be less efficient than quinine against the intracorpuseular stage of the benign tertian parasite. In the other case one 4-cg. dose was followed by the cessation of one paroxysm, converting the infection from a double to a single one. Quinine was then given and the fever ceased.

In the first of the above cases the effect of the tartar emetic on the malarial parasites was very striking, but in the second and third it appeared to be less efficient than quinine against the intracorpuseular stages of the parasite, while it is certainly far less convenient, owing to the administration of quinine by the mouth being much simpler than giving an intravenous injection.

Much further experience will be required to settle these points, but the indications to be derived from these few cases appear to be that quinine should be used to check the malarial paroxysms, while tartar emetic should subsequently be given intravenously, in the hope that it may prove of value in destroying the extracorpuseular stages of the malarial parasites, and so prevent relapses, and greatly lessen the infectiveness of the patient to malarial-bearing mosquitoes, by killing the crescents of the malignant tertian variety and the corresponding resisting forms of the other types of malaria.

In view, however, of the many disappointments which have been met with in attempts completely to eradicate the protozoal parasites of malaria, sleeping sickness, and amebic dysentery, it is well not to be too sanguine regarding the success, possibly only temporary, of tartar emetic given intravenously in causing the malignant tertian crescents to disappear from

the peripheral blood in the two cases of Rogers. The observations are, however, of sufficient interest and importance to make it advisable to place them on record without delay, in order to allow others to investigate the subject, as many prolonged observations will be necessary before any reliable conclusions can be arrived at. If this drug should prove successful in really curing malaria, or in removing the infectiveness of the patients treated with it, a new and most important addition to our armamentarium in the battle against the most wide-spread scourge of tropical and subtropical countries will have been made, the value of which it would be difficult to overestimate.

MODERN DIAGNOSIS AND RESULTS, CLINICALLY, SEROLOGICALLY, AND SOCIOLOGICALLY, OF SYPHILIS.

B. A. THOMAS in the *Pennsylvania Medical Journal* for January, 1917, reaches these conclusions:

1. The treatment of syphilis, notwithstanding the promise of salvarsan and its substitutes, judged from the excellent serological results extending in many instances over several years, remains empirical.

2. The ultimate proof of cure does not rest necessarily upon continuously negative Wassermann reactions for one, two, three, five, ten, twenty, or even forty years, but rather upon complete freedom of symptoms for a generation or more.

3. The Wassermann reaction furnishes the best control of treatment and is the most reliable index of cure subsequent to proper treatment.

4. The sheet-anchor in the treatment of syphilis is no longer mercury, but salvarsan, neosalvarsan, or one of their substitutes. It is of paramount importance, however, that the injections of arsenobenzol in the beginning be administered as early as possible and intensively in full doses commensurate with the physiological tolerance of the patient, not scattered indefinitely over months, interspersed here and there with a Wasser-

mann test. In view of the possibility of immediate cure by this drug, properly administered in the primary if not in the secondary latent stages of the disease, the treatment of syphilis, particularly in the chancre period, prior to the advent of a positive Wassermann, becomes an emergency operation, in many instances, no less imperative than appendectomy. Our experience dictates, as a reliable routine, two injections of salvarsan in the early chancre stage; at least three injections in the late primary and throughout the secondary or latent stage of the disease; and during the tertiary and hereditary forms of syphilis not fewer than four to six injections, supplemented by mercury and the iodides. If, after such treatment, the Wassermann reaction still appears positive, a second series of injections should be administered.

5. Serologically judged on a three months' to a five years' duration, syphilis, in the chancre stage, if diagnosed early, either clinically or if necessary by either the dark-field microscope or the Wassermann reaction, may be cured by two injections of salvarsan or neosalvarsan; indeed, if the diagnosis be made, particularly before the advent of a positive Wassermann, one dose of either of these drugs may be sufficient.

6. Secondary syphilis seems to do just as well without mercury, provided enough salvarsan or neosalvarsan be given to produce a negative Wassermann.

7. The serological results in tertiary syphilis treated intensively with salvarsan and its substitutes are not so brilliant as those of the secondary period.

8. The best substitute for salvarsan and neosalvarsan is the Polyclinic preparation of arsenobenzol, which although apparently not so effective in eradicating the Wassermann, is essentially devoid of any toxicity, even less so than neosalvarsan. [This is not on sale.—Ed.]

9. The French preparation of arsenobenzol (Billon) and the Canadian diarsenol (Synthetic Drug Company) are beautiful products and may be just as efficient as salvarsan and neosalvarsan, but on account of their greater tendency to toxic phenomena

are not destined to supersede the original German products.

10. The arylarsonate, "soamin," and sodium cacodylate, both clinically and serologically, have no place in the effective treatment of syphilis.

THE TREATMENT OF SYPHILIS.

The *British Medical Journal* of January 13, 1917, contains an article by SEQUEIRA on the present-day treatment of syphilis by certain combinations of arsenic supplemented by mercury. Let us for the moment consider the evidence which is in favor of this as opposed to the old mercurial treatment.

The best evidence is that which has been afforded us by Gibbard and Harrison in their valuable work in the military hospitals. It is impossible in civilian practice to carry out the continuity of observation which these officers have been able to obtain. Sequeira will not quote their figures at length, but he mentions that of 378 cases treated by mercury alone there were clinical relapses during the first year in 83 per cent, while of 152 cases treated by salvarsan and mercury the clinical relapses were only 3.9 per cent. This difference is so striking that it does not need comment. Gibbard and Harrison also showed by statistics the importance of early treatment, for in 70 primary and 130 secondary cases treated by modern methods the proportion of relapses, including both clinical and those only recognized by the blood test, was 11.3 when the treatment was begun in the primary stage, while it reached 33.7 when the treatment was postponed until the secondary stage.

A third point is the fact that the serum of a primary sore or of condylomata may be teeming with spirochætae, as observed by dark background illumination, and within twelve hours of giving an injection of salvarsan or one of its allies no spirochætae were found. Do not, however, look upon this as evidence of one dose of salvarsan curing a case. There is evidence to show that there may be both clinical and blood test relapses even after several injections.

The only way to effect a cure is to treat the patient sufficiently early. There are some cases in which, even after numerous courses of treatment, we are unable to effect a permanent change in the Wassermann reaction.

The arsenical preparations for intravenous injection fall into two groups, the types of each group being salvarsan (606) and neosalvarsan (914). The salvarsan group, to which kharsivan and arsenobenzol belong, are acid in reaction and require careful neutralization by a solution of potassium hydrate. The neosalvarsan group includes novarsenobenzol, novarsenobillon, and does not require neutralization. Galyl does not require neutralization. These drugs are dissolved in sterile saline solution.

The most recent introduction is Danysz's luargol, a combination of arsenobenzol with silver, bromine, and antimony. It is given intravenously in alkaline solution, but recently a soluble sodium salt has been made which is more convenient to use. It is too early to say more than that the results, so far, are very promising.

The next question of importance is, Shall the drug be in dilute or concentrated solution? There are many advocates for the administration of concentrated solutions. The advantage is that the injection can be made with a syringe containing 10 Cc. of the solution. If the operator is expert the injection of this small quantity of solution with a Record syringe is a simple matter. The needle is introduced into the vein and a little blood is withdrawn, showing that the vein has been entered, and then the solution is slowly introduced. The disadvantage is that without great care it is easy to pass the needle through the wall of the vein and to inject the highly concentrated solution into the connective tissue, a procedure which immediately causes intense pain, and, what is infinitely worse, a necrosis of tissue with ulceration which may take many weeks to heal. Sequeira therefore strongly urges that until a man has mastered the technique and feels quite sure of himself, he should use dilute solutions.

The dilute solutions are usually made up to 100 Cc. They are introduced either by

gravity or by a pressure bottle. The gravity apparatus is preferred by many. It consists of two vessels, one containing normal saline and the other the solution. Two rubber tubes governed by stop-cocks lead to a single tube to which is attached the needle. It is usual to have a piece of glass tube as a window inserted in the rubber near the needle. The needle is introduced with the reservoirs at a low level, and as soon as blood appears in the glass window the apparatus is raised to about 4 feet above the patient. First a little normal saline is run in and then the solution, and finally a little more normal saline. The needle is then withdrawn, and the puncture covered with a pad and bandage.

In his clinic they employ a convenient apparatus devised by McIntosh and Fildes. The solution is placed in a glass bottle with a rubber stopper through which passes one tube to the needle, while the air pressure in the bottle can be raised by a Higginson syringe, care being taken that the air passes through a tube plugged with cotton-wool. The apparatus, which is made by Messrs. Baird & Tatlock, is small and portable.

A two-way syringe drawing in saline first and then the solution is also in use.

In all intravenous injections the following precautions must be observed:

1. The urine must be tested before each injection.
2. The drugs are sent out sterilized, but the saline or distilled water and all the apparatus must be carefully sterilized.
3. Care must be taken that the drug is completely dissolved.
4. The site of injection must be well washed and then carefully cleansed with ether or painted with iodine.
5. The vein must be made prominent by applying a rubber tourniquet or band round the upper arm. Immediately it is known that the vein is entered the tourniquet or band must be released.

Sequeira prefers in all cases to give the patient a rest for a night after the injection.

Of 1120 consecutive injections given in his department the temperature rose above 100° F. in 149 instances—namely, 13.3 per

cent; of these, 29 reached 103° F. or over—namely, 2.6 per cent. The febrile reactions are met with chiefly after the first injection and mostly in the florid secondary cases. Other symptoms are slight shivering, with occasional vomiting and diarrhea. In rare instances a scarlatiniform rash occurs, apparently due to the drug.

In very exceptional cases, in the early days of the salvarsan treatment, he saw symptoms of meningitis. In a case under his observation the patient complained of headache on the third day after the second dose. This was followed by convulsions, and the patient died in coma on the fifth day. In these rare cases multiple small hemorrhages have been found in the meninges of the encephalon.

Another reaction is characterized by symptoms of nephritis, uremia, and suppression of the urine. These phenomena are believed to be due to renal inadequacy. A transitory jaundice may also appear, and in very rare instances toxic hepatic symptoms.

Pulmonary embolism has also been described. It has occurred as a sequel to thrombosis of the vein used for injection.

Much has been written on cranial nerve affections following injections of arsenical compounds. Seventh and eighth nerve paralysis has been observed. It is more probable that the paralysis is due to the syphilis, and cases are recorded in which a further injection has cured the condition. A transitory vasomotor crisis sometimes follows the injection, the face becomes swollen, congested, and sweating, the pulse rapid and dicrotic, and the patient complains of headache.

These considerations suggest the importance of carefully selecting cases. The following general conditions are held to contraindicate the injection of these drugs: (1) Renal disease of non-syphilitic origin. Albuminuria without casts may be due to the syphilitic poison, and Sequeira has several times seen it clear up after an intravenous injection. (2) Grave heart disease and (3) hepatic cirrhosis are also conditions in which it is dangerous to carry out the treatment.

The subsequent treatment of the patient by mercury demands a few words. The most satisfactory method is intramuscular injection. Sequeira uses a mercurial oil as follows:

Mercury, 66 grains;
Sterilized anhydrous lanolin, 4 drachms;
Sterilized liquid paraffin, 6 drachms.

One grain of mercury is injected once a week. The oil may require warming, especially in cold weather, to allow it to pass through the needle. The site for injection is the outer third of a line drawn from the anterior superior spine of the ilium to the top of the gluteal cleft. Alternate sides are used for the injections. The needle should be 2 inches in length, and should be carefully sterilized before introduction, the site of injection also being cleansed with ether or painted with iodine. The needle is plunged vertically to the surface deeply into the muscle and the injection is made slowly. There is some subsequent pain, and the patient should rest for a little while after the operation. Sometimes there is difficulty in getting the patient to come regularly for these injections, and in such cases the inunction of one drachm of mercurial ointment daily should be ordered. The inunction is made into a soft part of the skin—for example, the sides of the chest, bends of the elbow, etc. The ointment must be well rubbed in, a quarter of an hour being allowed for each rubbing, and two rubbings should not be made consecutively in the same place. A course of thirty rubbings may usually be given, but if the gums show signs of mercurialism the process should be suspended.

A third method is to give Hutchinson's pill containing

Hydrarg. cum creta, 1 grain;
Pulv. ipecac, etc., 1 grain,

three times a day after food.

The first course of treatment should consist of three intravenous injections at weekly intervals, followed by eight intramuscular injections of mercury. At the end of two months the Wassermann reaction should be examined. In about 70 per cent of Sequeira's primary and secondary cases

it is negative at this period. The blood test should be made again after three months, and if it is positive, as is not infrequent, especially in secondary cases, the treatment should be repeated. At regular intervals the blood should be again examined, and further treatment given if required.

In all cases the patient receives a paper telling him how to avoid spreading infection, and is given instructions as to diet, especially abstinence from alcohol.

Treatment of Congenital Syphilis.—As a routine Sequeira prefers mercurial inunction, and a quarter of a drachm of mercurial ointment is rubbed into the abdomen once daily after bathing. A flannel binder is worn over the ointment. The mother should be treated if possible. The duration of mercurial treatment in the infant should be controlled by the Wassermann reaction. Intravenous injection in young babies is so difficult that it is rarely practicable. Treatment through the mother, if suckling, may prove satisfactory. The presence of snuffles sometimes prevents the child from suckling, and in such cases feeding by a spoon must be adopted.

Persistence of Blood Reaction.—One meets cases in which, in spite of repeated treatments, the Wassermann reaction cannot be rendered permanently negative, and the important question arises whether treatment should be continued indefinitely and whether such subjects should be allowed to marry. From the point of view of the public health we may say definitely that so far as our experience goes patients who have had these repeated courses and yet have a positive Wassermann reaction are not a source of infection, and we believe that it is safe for them to marry. Hutchinson's long experience showed that marriage was safe after mercurial pills for two years, when it is known that over 50 per cent of the cases would have a positive Wassermann.

Where the patient has a persistently positive reaction Sequeira thinks it is wise to give a short course of mercury at least twice a year.

TREATMENT OF ACHYLIA GASTRICA: SIMPLE OR BENIGN ACHYLIA.

In the *Glasgow Medical Journal* for January, 1917, MACLENNAN says that the medicinal treatment aims at stimulating the gastric glands to a better secretion. Bitters are sometimes useful, but alone are not sufficient. By far the most important therapeutic agent we possess is hydrochloric acid, more especially when it is combined with pepsin. If it be kept in mind that about three pints of gastric juice are normally secreted in twenty-four hours, and that hydrochloric acid is present in from 0.1 to 0.2 per cent, it will be seen that the dose of dilute acid must be very large. Indeed, it is not practicable to administer all the acid represented in the normal output. In cases of permanent total achylia the administration of hydrochloric acid must be as continuous as is the administration of thyroid in myxedema. But in all those in which the glands are not destroyed, but only functionally inactive, the patient's gastric contents should be tested at intervals to avoid the possibility of producing an artificial hyperchlorhydria. The dilute hydrochloric acid should be administered in one dose after the three principal meals. These should contain all the proteid material which is to be administered in the day's dietary. These three meals should be taken at five-hourly intervals. Starchy material should not form a large proportion of their contents. The carbohydrates should be partaken of in the intervals—three hours after each meal—and should, as far as possible, be eaten quite dry, and any fluid which may be desired taken when the solids are finished.

It will be found in practice that perhaps the best form for administration of the artificial digestive is:

Acidi hydrochlorici diluti, ounce i-ij;
Glycerini pepsini, ounce ij½;
Extracti condurango liquidi, ounce j;
Aquæ chloroformi, ad ounce vj.

M. Sig.: Drachm ij, in water, thrice daily after food.

If any fermentation is evident, a small dose of resorcin may be added to the above.

Various other bitter tonics may also be tried from time to time during the treatment. Sometimes strychnine is useful, with or without physostigmine. In cases in which there is motor insufficiency, as in the achylia with gastropnoxis, this combination will be found useful:

Strychninæ sulphatis, grain 1/24;
Physostigminæ salicylatis, grain 1/96;
Quininæ hydrochloridi, grain 1;
Extracti euonymi, grain ¼;
Gingerine, grain ¼.

M. Ft. pil. mitte tales, 60. Sig.: One pill thrice daily after food.

In the treatment of pernicious anemia we are too often content to administer arsenic alone, and to think that no further medicinal treatment is of any value. But much good can be done to prevent toxemia and improve the blood in proportion to our ability to remove the accompanying achylia or to compensate for its presence. Many of the severe gastrointestinal symptoms which so rapidly deteriorate the patient are due to the accompanying achylia. In all cases of pernicious anemia the treatment for achylia, in its fullest extent, should never be omitted. To the artificial gastric juice may be added an appropriate dose of the acid solution of arsenic.

RECTAL VS. VAGINAL EXAMINATION IN LABOR.

In the *American Journal of Obstetrics and Diseases of Women and Children* for February, 1917, MOORE states his belief that rectal examination *per se* has some advantages over the vaginal route, as the following will show:

1. Practically painless.
2. No danger of sepsis.
3. Easy to perform, as it does not require any preparation of patient or physician.
4. Can make any reasonable number of examinations with no danger of puerperal sepsis following due to the examination.
5. By more permissible examinations, progress of labor can be satisfactorily followed.
6. Rectal condition, as tumor noted.
7. Confirm emptying of rectum in labor, as scybalous masses may be present.

8. Can take plenty of time for the examination.

9. Certain uterine abnormalities recognized better per rectal route when seen late in pregnancy or labor, as the existence of a second non-pregnant horn of a uterus bicornis, which is usually situated posteriorly.

10. Peace of mind of the accoucheur during a fever in the puerperium, as also freedom from blame to the physician himself as far as a vaginal examination is concerned.

11. Fetal parts felt only by rectal route in certain uterine tumors, as fibroid on anterior surface of womb, or in backward displacement of the uterus.

Because of the possibility of introducing the thumb between the labia in a patient already prepared for delivery, it is best to use a sterile glove during a rectal examination. Short-fingered accoucheurs should certainly use the sterile glove. An ordinary clean glove might be employed by others. Mucilage of tragacanth should be used as a lubricant instead of vaselin, as the former is easily washed off the glove.

The areas near the so-called rectal valves should not be confused with the cervix.

Rectal examination alone is no competitor and cannot replace the vaginal route. Moreover the rectal exploration together with an abdominal examination in pregnancy and labor is too conservative. But notwithstanding that the latitude of possible error is greater in a small percentage of cases by the rectal route, he thinks that the trinity of methods, a vaginal examination in pregnancy, abdominal palpation in pregnancy, and labor with the employment of the rectal route in parturition, for all practical purposes, is a worthy substitute for the vaginal examination in labor.

The above combination of methods, however, should be subject to the following rule: When in doubt concerning the diagnosis of important conditions by the rectal route, resort immediately to the vaginal method. It might be said that as over 90 per cent of labors are normal, why use the vaginal route, except when an operative procedure is indicated. Is it scientific to

hobnob with chance and bed-fellow with luck? This is the age of preventive medicine, and many serious obstetric conditions can be avoided by the early knowledge on the part of the operator of the true situation before craniotomy is indicated. We should at all times keep in touch with the work, and by so doing avoid error as much as possible.

It appears to be a remarkable fact how little the rectal route is used either in maternities or in private practice. De Lee suggests its use to avoid frequent vaginal exploration during parturition, while Kerr remarks that "a rectal examination is rarely if ever called for in obstetric practice." Rectal examination, like the vaginal route, merely requires experience in order to recognize conditions. It is not a difficult method of diagnosis. Nor should the rectal route develop a timidity about making a necessary vaginal examination. It will probably make the obstetrician careful concerning unnecessary use of the latter method.

The writer has found the rectal route useful in the following conditions:

1. In conjunction with abdominal palpation in pregnancy and labor, and a vaginal examination in pregnancy for diagnostic purposes in parturition.

2. As an adjunct where the vaginal route is employed in labor, to avoid numerous investigations by the latter method, to note progress of labor, and possibly to discover the cause of delayed labor.

3. To get information concerning a gauze sponge left in the vagina after a perineorrhaphy. The bulging of the sponge is felt in the rectum.

4. To see in the puerperium if the uterus is retrodisplaced; to guide us in permitting early getting out of bed.

5. Routine rectal examination in pregnancy may discover a rectal carcinoma, pedunculated fibroid of the rectum, uterine tumors and abnormalities, etc. Cæsarian section is indicated in rectal carcinoma, as it is harmful to drag a child forcibly past such a tumor.

6. Observe advancement of the head during a pain, to note progress of labor.

7. To note whether the placenta, after detachment, lies in the lower uterine segment or vagina.

8. In delayed labor to note if spines of ischium are prominent.

9. After a forceps operation, in suspected cases, to see if spines of ischium or coccyx are fractured.

10. In "twilight sleep" the rectal route, usually causing little disturbance of the patient, can be employed to note progress of labor.

11. Using rectal examination combined with abdominal palpation in labor, the time for making the primary vaginal examination can be estimated.

12. Sometimes manual flexion of the head in delayed labor can be slightly corrected, thus helping anterior rotation.

13. Nurses understanding rectal examination can more efficiently watch the progress of labor.

His conclusions are as follows:

1. Rectal examination alone, nor when combined merely with abdominal palpation in pregnancy and labor, as a substitute for vaginal examination in parturition, is not compatible with an intelligent management of childbirth.

2. But the rectal route with abdominal palpation in pregnancy and parturition, and the vaginal examination in pregnancy, subject to the rule, "when in doubt . . . resort to the vaginal route," can be used in the majority of labors without necessitating any vaginal examination during labor. Keep out of the vagina in labor except when necessary to do otherwise.

3. Do a primary vaginal examination in all cases first seen in labor and in all cases of delayed labor, and of course where operative interference has been indicated.

4. Use the rectal route as an adjunct to a primary vaginal examination, thus avoiding numerous vaginal examinations, which should always be condemned.

5. Do the vaginal examination before rupture of the membranes, the cervix being dilated, as diagnosed per rectum, and get

the benefit of the autogenetic douche of liquor amnii.

6. Rectal examination and abdominal palpation in pregnancy and labor should be more thoroughly taught in medical schools.

INTRAVENOUS INJECTIONS OF ANTIMONY IN MALARIA.

The *British Medical Journal* of January 6, 1917, points out that since 1906, when Nicolle and Mesnil first recommended the use of antimony in trypanosomiasis, this drug has also been used in the treatment of dermal leishmaniasis, ulcerating granuloma, and Mediterranean and Indian kala-azar. To Broden and Rodhain belong the honor of having first devised the method of giving the salt intravenously, a procedure which got over the difficulty of oral and subcutaneous administrations. The results obtained in the different diseases mentioned have been satisfactory on the whole, but the difficulty of completely eradicating protozoal parasites is well known, and in trypanosomiasis, at any rate, relapses have not been infrequent even after several courses of antimony injections. Great success has followed intravenous injections of tartar emetic in that intractable form of ulceration known as "ulcerating granuloma of the pudenda," and what is known as dermal leishmaniasis in South America has also reacted very favorably. Following up these discoveries many different authors have employed such injections in kala-azar, the results obtained having been much better than by any previous method of treatment.

In a paper published in the *British Medical Journal* of January 6, 1917, Sir Leonard Rogers records a series of interesting observations on cases of malaria treated by tartar emetic injections. In two of these the injections caused crescents to disappear from the peripheral blood, and in another benign tertian gametes disappeared. Should it be proved that injections of tartar emetic will sterilize cases of malaria a great advance will have been made even on the quinine method, but, as Rogers indicates, a good deal more work and the lapse of a

longer time will be needed to determine this point. The disappearance of the gametes alone will not, of course, effect a cure, for the active asexual forms must also be acted upon and killed off. New drugs have from time to time been brought forward for the treatment of malaria; in fact, there is a French one on the market now called "diemenal," a solution of colloidal manganese, which is said to cure malaria much more effectually than quinine, and also to prevent relapses. Time alone will show if such a claim is well founded, and the same must be said of antimony.

Rogers's observation is interesting, and may prove to be very important. The results of his own further observations will be awaited with interest, and doubtless the publication of his preliminary note will stimulate others to put this method to the test.

TREATMENT OF ABORTION.

BRODHEAD in the *New York Medical Journal* of March 31, 1917, states that in threatened abortion the woman should have absolute rest in bed, light diet, if possible the services of a trained nurse, the bowels should be emptied by gentle laxatives or enemas, and visitors should be excluded. With slight bleeding, even when there is no pain, he has usually ordered small doses of morphine, one-tenth grain three times a day. Viburnum is used very extensively, but the writer feels skeptical as to its therapeutic value. The ice-bag is also advocated, and is probably of some value, but morphine is the best agent at our disposal. When the bleeding is moderate or profuse, or when there is pain, a hypodermic injection of morphine one-sixth grain is given, and repeated according to the necessities of the case, enough being administered to relieve the pain. In Brodhead's opinion, vaginal packing should only be used when bleeding is profuse, or where the patient is bleeding moderately and is living at some distance from medical advice, for no one can foretell when a profuse hemorrhage may occur. He believes that the tampon, although

necessary in some cases, is very likely to cause dilatation of the cervix and hence hasten the abortion. He is aware that the tampon is considered by some to be valuable in the control of threatened abortion, but his experience leads him to believe it should be omitted, except under the conditions just mentioned. The amount and character of the bleeding cannot be considered an infallible guide in prognosis, for many patients bleed profusely and still continue along in pregnancy without further mishap. The patient should be kept in bed until at least several days have elapsed, with no bloody discharge.

When the abortion is inevitable and pregnancy has existed up to two and one-half months, we may tampon and wait for the completion of the abortion, or dilate and curette at once, or give a full dose of pituitrin (1 Cc.) and repeat after one hour, tamponing or curetting if this plan of treatment is ineffectual. He cannot agree with some authorities that all early cases of inevitable abortion should be curetted at once. Operative treatment in the hands of competent surgeons is safe, but many accidents such as perforation of the uterus and laceration of the cervix have complicated the usually simple operation of curettage, and septic infection not infrequently follows unskilful or careless work. Certainly in the hands of inexperienced men the use of the tampon is safer and is frequently attended with excellent results. In three instances where the patient has had no pain, he has used full doses of pituitrin with very gratifying success, and in a considerable number of this variety of cases in which there have been both pain and bleeding, he has had excellent results with pituitrin.

A patient four to four and one-half months pregnant entered the Harlem Hospital, having slight irregular pains which she had had for hours prior to admission. There was slight bleeding, and a central placenta previa was found; the cervix admitted two fingers. A hypodermic injection of 1 Cc. of pituitrin was given, and within an hour the uterus was emptied, the fetal sac being expelled intact. In any

event the treatment can do no harm, and if a curettage can be avoided there is a distinct gain in following the procedure. When pregnancy has advanced beyond the third month we may await the completion of the abortion, give pituitrin, or tampon and wait for full dilatation or complete expulsion of the ovum. In some cases embryotomy or manual extraction of the fetus and placenta will be necessary. In this type of cases the emptying of the uterus is made much less difficult, if time has been allowed to obtain complete dilatation and softening of the cervix, or at least sufficient dilatation to enable one to extract the fetus and placenta easily.

ANESTHESIA AND ACIDOSIS.

SANDERS in the *New York Medical Journal* of January 27, 1917, directs that when the patient is returned to the warm bed he should have a pillow, unless shock treatment is required. The room should be quiet, darkened, and well ventilated. A retentive enema of one pint of a five-per-cent solution of lactose and sodium bicarbonate two per cent is given at once. Eight-ounce retentives of the same solution are given at three- to four-hour intervals. Quinine muriate in ten-grain doses, added to the first four of the enemas, prevents backache and gas pains. If preferred, the solution may be given by the drip method.

In cases of severe infection Hogan recommends a five-per-cent solution of anhydrous dextrose by the drip method, adding: "I have found the rectal or intravenous injection of sterile hypertonic anhydrous dextrose solutions—up to eighteen per cent—to produce most spectacular results in anuria, ileus, coma, persistent vomiting, and glaucoma."

As soon as the patient can take liquids by mouth, sips of sodium or calcium bicarbonate water should be given. Fruit juices with sugar added, forming a "fruitade," make them grateful to the patient. The sugar furnishes the additional carbohydrate needed, while the fruit acids are oxidized to bases constituting a further feeding of

alkali. Later, carbohydrate feeding may be increased by use of malted milk, cereal gruels, and then fruit albumen.

Pain and restlessness are relieved by the use of bromides, chloretone, and veronal. When vomiting does not occur, vigorous sugar alkali treatment should be pushed, and lavage with the alkaline solution practiced, if necessary. Sodium bromide or chloretone given per rectum is helpful.

A powder of cocaine one-fortieth grain, menthol one-tenth grain, tincture of nuxvomica one minim, bismuth subnitrate one grain, and cerium oxalate two grains gives relief in some severe cases.

Some who have tried this treatment have reported that it did not give the results which its advocates have stated. Sanders believes this is because they have not fully followed out the really simple details of the technique as given above. He is sure this was so in a number of cases which he has observed.

SALVARSAN AND NEOSALVARSAN IN SYPHILIS.

ORMSBY in the *Journal of the American Medical Association* of March 31, 1917, reminds us that when salvarsan was first used, warning was directed particularly against giving the drug to patients with disorders of the kidney, heart, vascular system, and eyes. With increased experience, few of the original contraindications have remained as such. Where organic changes have occurred in any vital organ, the treatment should be given with care and always initiated with a small dose.

In order to safeguard the patient to be treated with salvarsan, it is absolutely essential that the technique be correct. This includes the use of freshly distilled and sterilized water for making the sodium hydroxide, the sodium chloride, and the salvarsan solutions.

The initial dose should always be small: 0.1 or 0.2 gm. of salvarsan, or 0.2 or 0.3 gm. of neosalvarsan. Should an idiosyncrasy be present, serious results are thus avoided.

It is well to have the patient on a restricted diet immediately preceding the injection, and elimination should have been promoted by catharsis. In the absence of the contraindications noted, this procedure offers most promise for good results.

The remarkable clinical achievements of salvarsan need not be considered in detail. The rapid healing of infectious lesions of the skin and mucous membranes and the gain in weight and general health are too well known to need emphasis here.

As has been previously stated, a definite technique cannot be outlined, as the patient has to be considered individually, as well as the disease with which he is suffering, and the stage and severity of the latter. In a review of the enormous literature of the subject, the general trend now appears to be to give salvarsan and mercury in courses of from five to eight injections of the former and from twelve to twenty injections of the latter, repeating the courses at intervals of from six to eight weeks and as many times as appears necessary in individual cases. The method employed by Ormsby, which follows, is perhaps an average of that used in various parts of the world.

He divides his treatment into courses of from five to eight injections of salvarsan and twelve to twenty injections of mercury, or the equivalent of the latter in inunctions. The interval between salvarsan injections is from seven to fourteen days, while the mercurial injections are given every second day, if a soluble salt is used, and weekly if an insoluble salt is employed. The soluble salt usually selected is mercuric chloride, in dosage of one-fourth grain, and mercuric salicylate in dosage of from 1 to 2 grains.

In the chancre stage treatment is instituted with salvarsan, and one course is usually sufficient. Many of these patients have not developed a positive Wassermann and have remained free from symptoms for some years.

In active syphilis, mercury precedes salvarsan, to prevent neuro-recurrences, and three courses are given, with a rest of from six to eight weeks between courses. If after

the termination of these the reaction remains negative a year, a provocative treatment is given, when, if not followed by a positive reaction and the spinal fluid is found normal, a prolonged rest is given.

In tertiary and latent cases several courses are given, if necessary, together with potassium iodide.

In involvement of the nervous system, intravenous medication with salvarsan, together with intramuscular mercurial injections, precedes intraspinal medication. In the latter, Ormsby has employed only the Swift-Ellis method of injecting salvarsanized serum. He has not used the Ogilvie method of direct salvarsan injections, nor has he used intracranial injections. The latter methods have been efficient in the hands of others. He insists upon energetic treatment early, and believes that many of the failures are directly attributable to insufficient treatment. In a few selected cases he has employed the intensive method of Pollitzer with good results, but cannot accept it as routine.

In a recent report from the clinic of Professor Jadassohn (Bern), Nägeli states that 900 syphilitic patients were given 7000 injections of salvarsan and neosalvarsan with no fatalities and few reactions. The initial dose employed in this clinic is always small: 0.1 or 0.2 gm. of salvarsan and 0.15 or 0.3 gm. of neosalvarsan, and as a maximum dose 0.3 gm. in the case of women, and 0.4 gm. in the case of men, or 0.45 and 0.6 gm., respectively, of neosalvarsan. The absence of reaction in their cases is attributed to small dosage. The interval between injections averages one week, though in certain cases four days has been the interval. Injections of mercury, usually insoluble preparations, are added, and in certain cases potassium iodide also is used. They recommend repeating the dose before the Wassermann reaction becomes positive or before symptoms begin to develop.

Pollitzer gives three injections of large doses of salvarsan at twenty-four-hour intervals, followed by twelve mercurial injections. In secondary syphilis three courses are given, with two-month inter-

vals between courses. In older cases treatment is continued until the Wassermann reaction becomes negative, and subsequent to this two courses are given. After a year of Wassermann reactions a provocative injection is given and an examination of the spinal fluid is made.

Nicolas and Moutot, in 9000 injections, covering a period of three years, had two fatalities. In the group were 200 cases of primary syphilis, the chancre being of from three to thirty days' duration. These were treated with four or five injections, at eight-day intervals, or with four injections, followed later by two more. Most had subsequent mercurial treatment. A few of this group had recurrences; two had reinfections. In secondary syphilis they record many recurrences after eight injections. Among the cases, in addition to the two fatalities, were many reactions, a few with coma or epileptoid seizures, and three cases of generalized exfoliative dermatitis, two cases of optic neuritis, and six of labyrinthitis.

Goubeau uses salvarsan, mercury, and potassium iodide in all cases. In primary syphilis he recommends excision of the chancre, forty-day treatment with injections of mercury benzoate, five injections of salvarsan, and lastly potassium iodide by mouth for forty days. Five or six cases were apparently cured by this method. In secondary syphilis, each period consists of five injections of salvarsan, followed by a series of mercurial injections, this being followed by a period of potassium iodide by mouth. He rarely gives more than two such periods. In sixteen of twenty-four patients, symptomatic and serologic cure was obtained. Eight had recurrences. In thirteen latent cases treated by this method, all the patients were serologically cured, with no relapses in two years. Patients with hereditary and nervous syphilis were improved.

In a recent contribution, Fordyce recommends the use of salvarsan and mercury in courses, each consisting of five or six injections of salvarsan, in dosage of from 0.3 to 0.5 gm. for men, and from 0.25 to 0.4 gm.

for women, at intervals of from one week to ten days, together with from twenty to thirty injections of a soluble salt of mercury, repeated daily or every second day, or from ten to twelve of an insoluble salt, repeated weekly.

In primary syphilis, before the Wassermann reaction becomes positive, two courses are given. In secondary syphilis, three courses are frequently necessary. In tertiary and latent cases, mixed treatment with potassium iodide and mercury is frequently added. In visceral cases he recommends salvarsan in small dosage.

Fordyce gives as criteria of a cure a negative Wassermann reaction for at least a year, continuing so after a provocative injection, and a normal spinal fluid, with certain exceptions. He urges energetic treatment in all cases.

THE TREATMENT OF GASTRIC ULCER.

In the *American Journal of the Medical Sciences* for April, 1917, SMITHIES gives this outline of his method of non-surgical treatment:

1. Rest in bed, both physical and mental, for from one to three weeks. Bodily and psychic activity stimulate peristalsis.

2. Rest to the stomach itself. When it is recalled that during an ordinary meal the digestive processes demand more than 2000 peristaltic waves, the effect of such a mechanical irritant to an ulcer or the ulcer-bearing area cannot be disregarded. Complete rest for the stomach also demands avoidance of irritating medicine, gastric lavage, and frequent abdominal examination of the suspected focus.

3. Local applications to the abdomen. Painful spasms are further prevented by having constantly applied to the abdomen compresses saturated with Ochsner's fluid (alcohol and boracic acid).

4. Keeping the stomach empty of food. This promotes healing by limiting local irritation from the food itself, from reducing the amount of gastric juice required to digest food, by limiting gastric peristalsis and avoiding painful gastrospasms which

limit free circulatory interchange. Total abstinence from food by mouth should be insisted upon for from three to seven days according to the case. The period of fast is determined best by clinical disappearance of gastric spasm (pain, regurgitation, water-brash, heartburn) and by fluoroscopic proof of absent or diminished gastric peristalsis. During the fast paraffin wax is chewed fifteen minutes every hour. It keeps the mouth clean, promotes free flow of protective saliva and mucus, counteracts painful hunger contractions and gastrospasms and allays thirst.

5. Rectal feeding. During the fast period, rectal feedings are instituted. From 500 to 1000 calories of nutrient mixture are given in twenty-four hours. Smithies uses a clyster containing 1 ounce of 50-per-cent alcohol, 1 ounce of glucose, with normal salt solution to make 240 Cc. The nutrient enema is given at body temperature by the drop method. The drops flow at the rate of 30 to 60 drops per minute. During the first day of rectal feeding, gtt. x of tr. are given with each enema.

6. When mouth feeding is begun. Usually from the fourth to seventh day. Three factors control the choice of diet: (a) nourishment should be liquid and administered warm in small quantities frequently and (b) carbohydrates should be selected.

(a) Small quantities of liquid food should be frequently administered in order that the stomach empty rapidly with the least effort and thus remain food-free for the longest time, thereby giving maximum time of rest for ulcer healing. The duodenal digestion must be called upon until gastric condition warrant demands being made upon stomach digestion. Keeping the stomach food-free keeps hydrochloric acid or pepsin production to a minimum. From 4 to 6 ounces of warm liquid are given every hour.

(b) As experimental facts have established, carbohydrate foods leave the stomach most quickly. Therefore, liquid carbohydrate mixtures (barley water, rice gruel, thin cream of wheat, thin creamed vegetable soup, etc.) are fed. Milk is not given in routine. Milk results in almost pure p

tein clots in the stomach. These act as do other proteins and remain for a long time in the stomach as a source of irritation, as stimuli to acid secretion and as choice culture media for bacteria. If milk be given at all, it should be first parboiled or predigested. Carbohydrate liquids produce the least secretion of HCl and pepsin and are weak stimuli of gastric peristalsis and impose the minimum of work upon the duodenum. It should be recalled that the pylorus opens only when the duodenal contents are neutral or alkaline. If the gastric contents are of such nature as to impose slight demands upon the stomach secretions and motility, the duodenum has little work as a neutralizer to perform and the pylorus remains free from spasm and opens readily. There are thus avoided gastric stagnation and accumulation of distressing free and combined acids, which prevent healing and which usually demand frequent lavage or the exhibition of large quantities of alkali.

7. Limitation of overproduction of gastric acid. This is obtained by keeping the stomach food-free as above described. This secondarily limits both the frequency and the strength of gastric peristaltic waves. Unless food leaves the stomach rapidly, gastric glands continue secretion and coincidentally stress of gastric peristalsis upon the pylorus keeps up constant irritation of ulcer-bearing areas.

If the above points established by modern physiological research are borne in mind, the exhibition of large quantities of alkali are unnecessary. Their use is certainly unscientific. Providing the gastric lumen is patent, the stomach empties freely. There is no stagnant, irritating, fermenting residue. Large quantities of alkali, according to Pawlow and to our clinical and laboratory experience, create pernicious increases of gastric acid and of mucus and generally demand relief by lavage. Moreover, we have shown that many gastric ulcer cases do not exhibit hyperacidity or hypersecretion. It is true that the stomach can neutralize large quantities of alkali if compelled to do so, but there is no physiological reason why it should be called upon to thus

overwork. It will be remembered that the normal habitat of gastric epithelium is an acid or at the best a neutral medium. If these epithelial cells are called upon to live in an excess of alkali, they live, as it were, in the presence of a foreign body. Experiments in artificial tissue growth have shown that cell proliferation is retarded by hypertonic alkaline solutions. Hence, overalkalinization may prevent healing. Attempts at protection from this foreign body (excess alkali) are shown (1) by the acid-producing glands oversecreting, and (2) by the mucoid degeneration of physiological fatigue which results in the throwing out over the secretory glands of a protective layer of mucus. The vicious circle thus formed results in enormous secretion of acid and mucus and is doubtless at least a partial explanation of the so-called hypersecretion associated with gastric ulcers, particularly when such are treated by the overalkalinization method. To combat this condition of affairs the patient's stomach must be washed frequently or greater quantities of alkali must be given in order to overpower the stomach's defensive mechanism and produce fatigue or exhaustion of the acid-secreting mechanism. It is a common observation that those patients who are treated for ulcer by the overalkalinization procedure always require frequent gastric lavage in order to insure their comfort. This frequent lavage is to be condemned not only on account of its disagreeable features, but because it acts contrary to the primary requirement of healing, namely, rest of the affected part. It is quite evident to those who have watched the behavior of a stomach by means of fluoroscopic screen when a tube is inserted into it that gastric lavage defeats this primary principle of healing. Lavage is generally accompanied by vigorous gastric contractions that persist not only during the maneuver but often for a long time afterward. If dieting is arranged on the carbohydrate basis, alkali is given in only sufficient quantities to keep the stomach slightly acid or neutral and to neutralize the duodenum, thus aiding in pyloric relaxation; gastric lavage need rarely be insti-

tuted during the entire course of a patient's treatment. In the past five years Smithies has not employed lavage therapeutically in ulcer cases more than a dozen times. Lavage is so rare a procedure in his clinic that his associates and patients consider such an order as almost contraindicated. It is readily judged how a treatment of which lavage does not form a prominent feature contributes much to a patient's peace of mind and shortens the period of hospital incarceration.

8. Medical treatment. It is doubtful if any form of medicine has a direct healing effect upon peptic ulcer. Medicines are administered largely to counteract discomfort due to three main causes, namely, (a) painful gastrospasm, (b) accumulations of overacid gastric contents associated with peristaltic unrest, (c) pain associated with perforation.

(a) Painful gastrospasms are usually controlled by carrying out the dietetic principles which Smithies has above mentioned. The chewing of paraffin wax relaxes the pyloric spasm largely through stimulating a proper swallowing reflex and by fatigue of hunger-like contractions. Certain types of case in which there is an individual vagus hypertonia, or when ulcers are located at or near the orifices, demand the exhibition of antispasmodic medicines, such as atropine, tincture of belladonna, or bromides. In the early stages of the treatment, when the stomach is being kept as free as possible of contents, atropine may be given hypodermically or bromides may be placed in the nutrient enemata. Later, when food is being given by mouth, tincture of belladonna in doses of from 5 to 15 drops may be administered fifteen minutes before feeding from three to six times daily. Smithies has not found useful, as analgesics, the exhibition of large doses of such "protective" medicines as bismuth and olive oil. These medicines doubtless act by affecting the rate and intensity of peristalsis, although they may have some effect in proved cases by direct action upon the ulcer. At times orthoform, given in 10-grain doses, in warm water, is an efficient

local anesthetic when it is able to come in direct contact with an open ulcer.

(b) For the relief of overacid gastric accumulation, sodium bicarbonate is contraindicated, because its administration results in the production of annoying accumulations of carbon dioxide with resultant gastric retention or painful belching, and because its neutralizing value is comparatively low. Large quantities of bicarbonate of soda are necessary to give relief, and the administration of such secondarily produces excessive gastric secretion. If alkalis are indicated, better results are obtained by the exhibition of frequent small doses of milk of magnesia or calcined magnesia. The ordinary case is very comfortable when from five to ten grains of calcined magnesia are given every two or three hours. Many cases require no exhibition of alkali if the physiological principles above outlined form the basis of the treatment. Only in very extreme cases is it necessary to employ gastric lavage. When it is employed, warm Carlsbad water (1 drachm of artificial Carlsbad salts to 1 quart of water) may be satisfactorily administered. Usually the exhibition of atropine or belladonna for the relief of gastrospasms exerts a definite effect toward controlling oversecretion of acid gastric juice.

CLINICAL EMPLOYMENT OF THE PORCELAIN FILTER.

In the *New York Medical Journal* of March 31, 1917, MCGURN states that the filter which he has employed in the intravenous administration of salvarsan and neosalvarsan for the past four years and the one he describes as of the Pasteur type has a filtering surface two and a quarter inches long and a circumference of four and a half inches. The wall of the tube is about one-eighth-inch thick and of sufficient porosity to negotiate 500 Cc. of salvarsan or normal salt solution in ten minutes, with a gravity of but twenty inches while a nineteen gauge needle is distally attached. Its outlet consists of a glazed, constricted extension, which serves as a

suitable male portion for the flexible slip-joint needle attached.

The material used in the production of this filter consists largely of kaolin, or North Carolina clay, which is first passed through a fine metallic screen having 140 meshes to the linear inch. The clay is then mixed with other physical ingredients to render it more plastic and again screened, after which it is subjected to several processes of sedimentation, steaming, drying, etc. It is then molded, bored, and placed in a kiln, where it is baked at a temperature approaching 2500° F. or 1371° C.—determined by color tests and pyrometric cones—for twenty-four hours, and allowed to cool gradually for a much longer period before being “drawn.” The constricted portion of the tube is then dipped by the glazier and refired. The tube is firm, hard, and white, but not fragile. It has a porosity that permits the passage of most of the smaller types of microorganisms, but it is impervious to bodies one-third the size of the red blood-corpuscle. These filters are unaffected by acid or other chemicals and can be used over and over again. When their surface becomes foul or plugged after prolonged severe usage they can be revived by brushing the surface with pumice or carborundum.

The limited purpose for which this special tube was first intended was to serve as a final filter in the intravenous administration of liquids, especially that of salvarsan, to insure against the possibility of extraneous matter of any kind reaching the general circulation. It has been shown after prolonged use, however, that ampoules of neither salvarsan nor neosalvarsan, when mixed with distilled water or chemically pure saline solution, are productive of complete chemical solution, and always contain bodies that appear in residue when such a filter is employed.

A few of the facts favoring the use of the porcelain filter are: (1) The filter can be successfully combined with any apparatus furnishing positive pressure or gravity of twenty or more inches. (2) Salvarsan or neosalvarsan cannot be produced in pure

chemical solution until it has passed a filter that would prove impervious to bodies one-third the size of red blood cells. (3) The transparency of a liquid is sorely lacking in proof of its chemical solution. (4) It affords protection against insoluble bodies of any kind reaching the general circulation and is an important safeguard against the retention of salvarsan. (5) It is impossible for air to pass the filter. (6) It provides against the possibility of neosalvarsan entering the vein when precipitated from its solution, either by partial oxidation or by excessive dilution with saline solution. (7) Patients are favorably impressed with the painstaking means by which their lives are protected from technical dangers. (8) With proper handling the filter and its parts are practically indestructible. (9) Only ten minutes are required for administration of 500 Cc. of solution, which permits gradual blending of the salvarsan with the blood-stream. (10) All insoluble irritants are removed from the solution, so that spasm of vein and its consequent stasis of salvarsan is never met with when the porcelain filter is employed.

THE TREATMENT OF TUBERCULOSIS WITH CYANOCUPROL.

In the *New York Medical Journal* of March 24, 1917, OTANI states each organ reacts differently to cyanocuprol, and smaller doses must be administered when the more sensitive organs are affected. The affected organs can be arranged in the following order according to their sensitiveness: kidneys, larynx, pleura, peritoneum and intestines, bladder and urethra, lungs, testicles, joints, and other surgical cases. The cerebral and cardiac membranes seem to be more sensitive than the kidneys. In more serious cases, as well as in those that have widely affected areas, smaller doses must be given. The doses depend upon the clinical course of the disease. A smaller dose than usual must be given when the patient has an active form, while a larger one may be given to a stationary case.

Smaller doses than usual must be administered to cases with malnutrition and anemia. If pulmonary hemorrhage, pain in the chest, dyspnea, rapid pulse, frequent coughs, or neurasthenia occur, smaller doses must be given. They must also be given to patients with high fever. For a chronic case with complications, the size of the dose must be determined by examination of the heart. A small dose must be given in pregnancy.

The age, weight, and constitution should also be considered in the choice of the dose, but the same dose may be administered independently of the size of the patient. To patients over sixty and to infants, an adequate reduction in the size of the dose must be made. Patients at puberty are apt to suffer from an active form of tuberculosis, and consequently great care should be taken. To women somewhat smaller doses should be given than to men. During the winter, or when the climate is unsettled, small doses must be given.

geal tuberculosis. Surgical tuberculosis should also be treated with a larger dose than pulmonary tuberculosis.

The method of determining the size of the second and subsequent doses is as follows: The drug acts differently in different individuals, and its efficacy can, therefore, only be determined with great care. The second and subsequent doses can only be determined by observing the results of the first injection.

1. If a given dose produces a marked reaction or the reaction does not subside after the third day, the dose is too large, and a considerable reduction must be made in the size of the next dose.

2. If a suitable dose has been given, the patient will not have any reaction; if a reaction is produced, it will subside completely in a few days, and improvement will be observed to set in within two weeks. In cases of this kind the same dose should be administered at the next injection.

3. The size of the suitable dose of

STANDARD SIZES OF DOSE.

Affected organs.	General condition.	Temperature.	Severe symptoms	Clinical course.	Dose
Lungs, first stage.	Good.	Normal.	None.	Quiescent.	7.0
	Good.	Normal.	Present.	Quiescent.	5.0
	Fair.	Below 38° C.	None.	Moderate.	6.0
	Fair.	Above 38° C.	None.	Active.	4.0
Lungs, second stage.	Good.	Normal.	None.	Quiescent.	6.0
	Good.	Normal.	Present.	Quiescent.	4.0
	Fair.	Below 38° C.	None.	Moderate.	5.0
	Fair.	Above 38° C.	None.	Active.	4.0
Lungs, third stage.	Fair.	Above 38° C.	None.	Very active.	3.0
	Good.	Normal.	None.	Quiescent.	5.0
	Good.	Normal.	Present.	Quiescent.	3.0
	Fair.	Below 38° C.	None.	Moderate.	3.0
Larynx. Intestines. Pleura. Peritoneum.	Fair.	Above 38° C.	None.	Active.	2.0
	Good.	Normal.	None.	Quiescent.	5.0
	Good.	Normal.	Present.	Quiescent.	3.0
	Fair.	Below 38° C.	None.	Moderate.	3.0
	Fair.	Above 38° C.	None.	Active.	2.0

The figures in the table have been chosen for adult cases on the basis of the precautions given above. They are intended only to show the standard size and should be varied in practical administration. If the case in question should be affected in more than one organ, the size of the dose must be determined by the severer affection or more sensitive lesions.

Tuberculosis of the kidneys is not given in the table; it should be treated with a dose twenty per cent less than that of laryn-

nocuprol becomes smaller and smaller, therefore, unlike other drugs, the dose must never be increased.

4. A very large dose sometimes has no effect. The dose should never be increased even if no reaction or improvement is observed.

5. If the same dose is given several times in succession, the patient will show no improvement, in spite of the efficacy of the dose set in at the beginning. This is due to the fact that the adequate dose has become

In such a case a smaller dose will produce better results.

6. If the given dose is considered too small, the size should not be increased, but the same dose should be continued, because the adequate dose will be gradually reduced and the right one will finally be reached.

7. The size of the dose must be decreased immediately if pulmonary hemorrhage, pleurisy, etc., should develop, or if the temperature should rise, the weight be reduced, or the disease should take an active form.

8. If such a reduction in the size of the dose is considered necessary, it must be diminished by ten or twenty per cent of the former dose. But if pleurisy, peritonitis, or laryngeal tuberculosis develops, still greater decrease is necessary.

9. This decrease is not necessarily made with each injection, but depends upon the reactions and the efficacy of the dose administered.

10. Some cases show great improvement after one injection, all the symptoms subsiding at once, but this lasts only for seven to ten days, and the symptoms then reappear. Temperature, râles, and laryngeal pain are the ones that usually subside temporarily. The size of the dose should never be increased; after the same dose has been given several times, improvement begins to set in.

THE TREATMENT OF INFLUENZA.

Writing in the *New York Medical Journal* of March 24, 1917, BROWN states that in the treatment of the catarrhal type of influenza, considering as the primary problem the destruction of the organism, it has as the result of long experience been determined that the drugs which are most useful and efficacious are quinine and the salicylates—salol, salophen, salicylic acid. A careful study of the antigrippe mixtures and capsules which are commonly used by practitioners practically determines the purpose of these drugs as basic constituents, and we must depend largely on these substances to destroy the infective organism.

The other ingredients contained in the grippe capsules or mixtures are usually incorporated for the control of symptoms, such as phenacetine or some other coal-tar preparation as an analgesic. If the catarrhal symptoms are excessive, camphor is added. If the type is severe and the headache intensive, he substitutes acetanilide for phenacetine. If accompanied by a cough or respiratory irritation, he prescribes codeine, morphine, or dionin. When acetanilide is prescribed, however, it is advisable to combine with it caffeine as a cardiac stimulant to counteract the depressing action of the coal tar. In other words, starting with the salicylates and quinine as the primary factors, the other ingredient must be introduced to meet the symptoms presented in each individual case.

In the enteric form, while still incorporating the basic principles of quinine and the salicylates, it is usually necessary to emphasize the opiates, preferably in the form of deodorized tincture of opium or powdered opium, to control peristalsis. In the rheumatic type, the coal-tar derivatives with caffeine should be emphasized in order to relieve the pain. In the cerebral or nervous type, while still emphasizing the basic and primary treatment, it is often necessary to prescribe the cerebral sedatives, such as bromide, chloral, etc., to control the excessive symptoms, and in severe cases spinal tapping may be resorted to.

In our efforts to treat and relieve the symptoms of this disease, we often overlook or minimize the fact that many of the complications, sequelæ, and active symptoms are directly dependent upon the presence of a toxin, and it is to this feature that Brown wishes especially to call attention in the treatment of the disease. He does not think that high colonic irrigations, the drinking of large quantities of alkaline waters, and the introduction of large quantities of sodium bicarbonate are utilized sufficiently. There is every indication of the presence of an active toxin. General practitioners have a tendency to adhere to the drug therapy and ignore the treatment of the mucous membranes with silver

nitrite, argyrol, etc., while the prospects of destroying the organism are well within possibility.

The generation of an antibody is a matter of great importance in the treatment of influenza and is usually neglected. Under this head Brown would call attention to forced feeding and the use of arsenic, strychnine, and nux vomica, and possibly vaccine. The mixed vaccine in the hands of Wright, Allen, and others seems to have been efficacious. But if the vaccine is used for this purpose, it must necessarily be a mixed vaccine. Brown does not see where much harm can be done by the use of this plan of treatment, but he does not think it should be advocated as a general procedure in every case of influenza. It would seem reasonable, however, under certain circumstances and in the hands of careful observers, to try the vaccine treatment in the severer forms of influenza.

Prophylaxis in the treatment of this disease is more important than in many of the minor contagious diseases from which we are so carefully protected by the sanitary experts. From his experience Brown believes that influenza is responsible for more destruction of life than any of the milder epidemics of the contagious diseases. Any effort to isolate the patient or to destroy his secretions and excretions is seldom made. The patient should be urged to use paper napkins or gauze for nasal and respiratory excretions, and the destruction by burning of all these substances should be insisted upon. We should also isolate the patient from the other members of the family, and as the intestinal tract undoubtedly contains infective media, the excreta should be disinfected. If more attention was paid to this feature in the treatment of influenza the number of cases in epidemics would decrease by thousands. Among the sources of infection and places to be avoided are crowded street-cars, subway trains, moving-picture houses, theaters, and churches. Brown thinks very much more serious consideration of prophylaxis should be undertaken in these epidemic and semi-epidemic outbreaks of influenza.

OBSERVATIONS IN A SERIES OF CASES OF TWILIGHT SLEEP—A REPORT OF FIFTY CASES.

In the *Virginia Medical Semi-Monthly* March 23, 1917, RUCKER and MASON read the following conclusions:

1. The method is safe from the standpoint of the mother.
2. When properly administered there is no danger to the child.
3. It is the best procedure for alleviating pain in the first stage of labor.
4. Inhalation anesthesia is necessary in the perineal stage in the majority of primiparae.

NOTE ON THE USE OF PHYLACOGEN IN PUERPERAL SEPSIS.

In the *Lancet* of March 10, 1917, REYNOLDS states that he thinks the following two cases may prove of interest to those who are so unfortunate as to run up against puerperal sepsis, and are not near enough a laboratory to have a vaccine prepared, or cannot wait for it:

A patient, aged twenty-six, married, strong, healthy primipara. On December 12, 1913, she had been in labor some hours before Reynolds was called, and was disappointed in her nurse, but was satisfied to have the services of a friend whom he found sitting on the bed clad in a greasy old fur motor-coat. It subsequently transpired that she was waiting to go into hospital with a view to operation, the history suggesting tubal mischief. Reynolds at once borrowed the nurse from another case near-by, who was perfectly satisfactory, and the confinement took place in a normal manner. On the two examinations were made, one on first seeing the patient, and the other after the liquor amnii was expelled. On the third day the pulse became more frequent, on the next the temperature started to rise, and intra-uterine douches of peroxide were given twice daily. In spite of these and other measures, the disease ran a severe course, and on the thirteenth day a clot was detached from the placental site during douching and lodged in the lower lobe of

the left lung. She collapsed at once, and began to cough violently, later on bringing up bright blood and mucus. That decided Reynolds to try mixed infection phylacogen, and he was able to inject some that afternoon. The symptoms improved with astonishing rapidity, and on the fourth day of the injections the patient was not only out of danger, but well on the way to recovery.

Patient, aged thirty, married, primipara. Five days before confinement, which occurred recently, her nurse brought her to Reynolds and called his attention to a mammary abscess. This was opened at once and swabbed out with chloroform. It healed before the confinement, which started with vomiting and weak pains which died away. Several small abscesses were noted on the buttocks and were painted with tincture of iodine. After twenty-four hours the patient had a frequent and weak pulse, so she was given an injection of morphine and atropine, which induced a few hours' sleep; food could then be taken. The pains set in more vigorously, but were not very strong, and as soon as the os was sufficiently dilated the membranes were ruptured, allowing the escape of a large amount of liquor amnii. Pains became more vigorous and the head reached the vulva, but after an hour so little progress was made that the child was delivered by forceps; its weight was 10¾ pounds. Reynolds had to wait three-quarters of an hour for the first pain after that, and expressed the placenta, as with the pain there was free hemorrhage. It came away entire. From the first day the temperature was elevated, and well within twenty-four hours the lochia were offensive. Much the same treatment was followed out as in the previous case, but on the seventh day, as the temperature reached 102° F., Reynolds decided to use phylacogen again, and started injection on the following morning. After two injections all untoward symptoms ceased, and on the third day the patient's condition was that of a woman who had had a normal labor.

These are the only occasions on which Reynolds has needed phylacogen. The first case was losing ground till it was used, and

the result was wonderful. In the second case the patient, like the first, was a strong woman, but in this case he had the advantage of an excellent nurse. There is no doubt in his own mind that this was a case of primary inertia which passed into secondary. It is true that the symptoms were not nearly so severe, as she never had a rigor, although she felt very cold the day before he used the phylacogen. Still, the fact remains, as her chart shows, she made no real improvement till the phylacogen was used, and he was nervous about her, because, rightly or wrongly, he looked upon the case as an infection before delivery—a condition he had never seen before.

THE CONSERVATIVE TREATMENT OF DISEASES OF THE NASAL SINUSES.

VANSANT in the *New York Medical Journal* of March 24, 1917, states that in carrying out these measures a thorough, careful examination and an accurate diagnosis are of the first importance. Certainly a maxillary sinus suppuration caused by the root of a decayed tooth or a molar abscess extending into the sinus does not call for a sinus operation, but rather for removal of the tooth and appropriate treatment. A sinus suppuration, even with necrotic bone, caused by syphilis, requires medical rather than surgical interference. Sinusitis associated with one of the exanthemata, or even influenza, calls first for improvement of the general condition and conservative treatment of the sinusitis. In sinusitis caused by the mineral poisons, phosphorus, etc., the removal of the patient from exposure to the mineral poisoning is necessary. A subacute or chronic catarrhal sinusitis should not be mistaken for an empyema. A maxillary sinus suppuration caused by pus descending from a frontal sinus should be handled by treatment directed to the frontal sinus rather than by extensive operation on the maxillary sinus. A thorough, careful, and accurate diagnosis is therefore a most essential feature of a conservative treatment. Any attempt to treat a sinus inflammation

and suppuration without surgical operation on the sinus must be based on well-established medical and surgical principles, and these are: (1) drainage and ventilation must be established; (2) pus must be evacuated; (3) the underlying causes must be removed.

Let us consider first the establishment of drainage and ventilation. We find in many cases that drainage from the sinuses is interfered with and prevented by intranasal causes. The principal intranasal causes are deflections of the nasal septum, enlarged turbinals, nasal polyps, and a turgescence of the nasal mucosa. A deflected nasal septum may completely or partially block the outlets to the nasal sinuses, so as to cause complete or partial obstruction to drainage from the sinus involved. In such a case the removal of the septum obstruction is clearly indicated rather than a sinus operation. A greatly deflected nasal septum also gradually causes atrophic and septic changes in the unobstructed nostril, leading to a sinus involvement. Here again a straightening of the septum is the proper method to be pursued. Nasal polyps may so retain pus in the sinus that all efforts to relieve the condition fail until the polyps are removed, and drainage established. An inflammatory turgescence condition of the turbinals and nasal mucosa frequently accompanies a sinus discharge. This swollen condition interferes with the drainage from the sinuses and must be relieved. This condition of the turbinals and nasal mucosa is perhaps the most frequent cause of obstruction to drainage from the normal outlets of the sinus. In treating it we can obtain temporary relief and drainage from the local application of drugs that contract the nasal tissues. Among such drugs, cocaine and adrenalin are preëminent. Another method of considerable importance is the use of absorbent cotton plugs saturated with solutions of the non-irritative silver preparations, the solutions being preferably made in glycerin. These plugs, after a weak cocainization of the nose, are placed between the swollen turbinals and the outlets of the sinuses; they excite a copious

mucous discharge from the nose with irritation and greatly reduce the congestion thus giving a better drainage from the sinuses. At times a partial or complete turbinectomy is necessary to secure drainage. Hot-water applications placed on the face and forehead also help to relieve the nasal and sinus congestion, and often give relief from pain. At times cold applications are more beneficial than hot ones. The internal use of certain of the coal-tar products seems to have a beneficial action on the inflammation of the sinuses and often is of great service in relieving pain. Another helpful measure that frequently aids in opening the normal outlets of the sinuses is the forcible injection of thin streams of heated air across or against the normal outlets. This has a very penetrating power and can be forced into small interstices thus frequently opening the obstructed normal outlets to the cells and sinuses, which then usually remain open; thus drainage is aided.

Retained pus must be evacuated. This can at times be done successfully by syringing the sinuses through their normal outlets with various fluids and injecting various medicaments. An accessory ostium may greatly facilitate this procedure. When the normal openings of the sinuses are inaccessible we can, particularly in the case of involvement of the maxillary sinus, use a trocar and cannula and thus inject the fluid into the sinus, removing the retained pus. This may be followed by injections of medicaments having a beneficial effect upon the mucosa. Again, position of the skull will help to remove pus from some of the sinuses. A patient with a suppurating maxillary sinus will aid drainage by lying down with the affected side uppermost. Also, when blowing the nose, the pus may be more easily removed by bending forward and turning the affected side upward. Another valuable method to secure evacuation of pus from the sinuses is the use of a suction apparatus. The nasal chamber should first be treated by cocaine and adrenalin and then the evacuation of pus aided by the suction apparatus. Complete

sion may be used alternately with suction; this gives in some cases excellent results.

We must remember that a sinus suppuration is at least a local septic process, and it must be treated as such. Frequently we find the patient suffering from general conditions, associated with, or due to, local sepsis. More or less anemia is usually present. Extension of the infection to the chest, causing bronchial conditions, more or less chronic, is frequent. Digestive disturbances are often associated with the sinus disease. The many disturbances affecting the eyes and vision have been the cause of much medical discussion. Pain in the head in various locations, according to which sinus is affected, is a symptom requiring careful diagnosis and treatment. We are also becoming more aware that kidney complications, obscure nervous conditions, and affections of parts far removed from the local focus of infection in the sinuses are frequently present.

THE MODERN TREATMENT OF DIABETES MELLITUS.

LEYTON in the *British Medical Journal* of February 24, 1917, recognizes that the causes of diabetes mellitus are not known, but thinks it will assist us to understand its modern treatment if we adopt a speculative explanation of its cause, even if this subsequently be proved incorrect. Diabetes mellitus includes at least three conditions:

1. Sugar in the urine with an increase in the sugar in the blood.
2. No sugar in the urine (at times) with a considerable increase of sugar in the blood.
3. Sugar in the urine without any increase of sugar in the blood.

The two conditions first named are in Leyton's opinion due to an altered nerve control of the pancreas, whilst the third is due to the production of a phloretin-like body in some of the tissues.

If the patient be suffering from any other disease which is likely to lead to dissolution during the next few months he should not be asked to undergo the discomfort of ali-

mentary rest because the recompense for the self-denial is too small.

Leyton's experience has taught him that, in spite of the fact that not infrequently a patient suffering from rapidly progressive pulmonary tuberculosis may lose the sugar in the urine as the disease progresses, nevertheless cases of diabetes complicated by pulmonary tuberculosis are not suitable for treatment by the Allen method.

Every effort must be made to be certain that the patient is not suffering from active tuberculosis. We all know that often it is extremely difficult to make up our minds on the diagnosis even when uncomplicated; when diabetes is present the difficulty is increased ten times. Many of the more delicate tests prove fallacious.

The rise of temperature with exercise will not necessarily take place in a diabetic. Tuberculin may not be used because any man who awakens quiescent tuberculosis in a diabetic is guilty of manslaughter.

The examination is limited to inspection, palpation, percussion, auscultation, and radiography. Even the most careful and experienced may err when limited to these methods of examination. When examination of the sputum proves the presence of acid-fast bacilli nothing more need be said.

Other forms of infection must be sought for and dealt with as far as possible before treatment is begun.

Especial attention should be paid to the gums; pyorrhea alveolaris is extremely common in diabetics, possibly because they have a poor resistance to most infections. In several cases removal of infected teeth and treatment of the gums without any modification in diet has led to the disappearance of even high percentages of sugar from the urine.

It is wise to remember that very severe cases of very long standing require a slight modification of the routine treatment.

Patients of no education who have not been taught control are unsuitable. They prove a trial to their physician and do not keep to the diet after they have left the institution in which they have been treated.

The physician must use judgment and

remember always that a patient who begins the Allen treatment and does not continue it is worse off than if he never attempted it.

The method of persuading the patient to undergo the treatment must depend upon the temperament of the patient. The doctor who has seen many cases which have been pronounced hopeless become free from sugar and return to their normal work will feel justified in painting the future upon the old treatment in its true colors. Perhaps any one with but little experience may not feel justified in doing this, because he is afraid of frightening his patient.

When a patient has consented to undergo the treatment he will ask, "How long shall I have to go without food?" An answer to this question is not easy. It is quite certain that the length of the period does not depend upon the percentage of sugar in the urine.

Leyton is under the impression that the greater the percentage of sugar in the blood the longer the fast required; in all probability future experience will show that this has many exceptions. Some months ago two cases were admitted upon the same day—a girl of sixteen passing 12.3 per cent sugar in the urine, and a woman, aged thirty-five, passing 1.25 per cent sugar. The blood of the young girl contained 0.15 per cent sugar, whilst that of the woman contained 0.5 per cent sugar. The girl's urine was free from sugar after alimentary rest for forty hours, whilst the woman had to fast six days before the glycosuria disappeared.

If the patient has developed diabetes comparatively recently a diet poor in fats is ordered for two days preceding the period of alimentary rest. This may consist of the same diet as the patient has been accustomed to with the exclusion of butter and fat meat.

Usually Leyton orders a breakfast of weak tea with very little milk, two eggs with a small piece of bread; lunch of 100 grammes of lean meat, 200 grammes of cooked cabbage, 60 grammes of boiled potatoes, and a small baked custard pudding. Dinner, a plateful of clear soup, 120

grammes of cooked green vegetable, an apple and an orange. In exceptional cases, very long standing and severe acidosis, it is wiser to diminish gradually the protein and carbohydrate after removing the fat before submitting the patient to alimentary rest.

Leyton warns us against giving a false prognosis to patients who come with a long history that for years they have passed sugar in the urine and carried on their work in comfort until a few weeks ago, when they began to be tired and to lose weight, and become rather more thirsty than in the past. This sudden alteration often indicates the awakening of tuberculosis; tuberculosis in diabetics may take months before it shows signs.

During the period of alimentary rest the patient receives a Seidlitz powder every morning, and if that does not prove sufficient it is supplemented by castor oil and an enema. He is kept in bed, but allowed to leave it for the morning bath and for short periods of nature. It has been asserted that sugar disappears more rapidly from the urine when the patient is allowed to get up and exercise; this assertion is not easily proved, and even if it were established beyond doubt, one would have to weigh the relative advantages of shortening the period of alimentary rest and the complete control of the patient. In Leyton's opinion complete control is the more important.

The patient should be shielded from all worries and annoyances. Diabetics are often short-tempered, and therefore every demand must be adopted to meet their wishes while under treatment.

During the period of alimentary rest the patient is allowed at breakfast time 200 Cc. of weak coffee without milk or sugar, 100 Cc. of clear broth made with an ounce of spoonful of meat extract which is poor in protein. At lunch he receives the same for breakfast. At tea, 200 Cc. of weak tea. At dinner, 200 Cc. of weak tea and 100 Cc. of clear broth. As much water and fruit as desired is permitted. If the patient is accustomed to alcohol, he is allowed the usual amount unless it is excessive. If not accustomed to any,

alcohol should be given only in cases of severe acidosis or extreme emaciation.

Leyton advises us most strongly to note down every detail, even as to the method of preparing tea and coffee, otherwise one will find his patient being given solutions of sugar, burnt and unburnt, instead of coffee.

The twenty-four-hour specimen starting from 8 in the morning is tested for sugar at 8:30 every morning with Benedict's solution, or with the indigo test; when it is found free from sugar, we conclude that the metabolism of the patient has altered, and the following progressive diet is begun:

The first day after the urine is free from sugar the diet should contain 5 grammes of carbohydrate; this might be given as a quarter of an ounce of white bread, but that would not be satisfying, nor would it tend to alleviate constipation. A vegetable containing a considerable quantity of cellulose and a little carbohydrate is chosen in order that the pangs of hunger may be assuaged by the bulk of the meal, and at the same time the intestine stimulated by the residue of the food.

When in season French beans are the most convenient, because they contain less than 2 per cent carbohydrate, and 250 grammes would be allowed on the first day. When French beans are not obtainable, cabbage boiled in three waters and then stewed in a little clear broth may be used as a substitute; or, if the patient is unable to eat cabbage, 230 grammes of cooked spinach, or 200 grammes of raw lettuce, or 140 grammes of celery may be substituted.

The urine is examined every morning, and, if free from sugar, the diet for the day is given.

First Day.—Breakfast: Weak coffee 200 Cc., cooked French beans 75 grammes. Lunch: Weak coffee 200 Cc., French beans 100 grammes. Tea: Weak tea 200 Cc. Dinner: Weak tea 200 Cc., French beans 75 grammes.

Second Day.—The quantity of vegetable is doubled, and three eggs are added to the diet.

Third Day.—200 grammes of lettuce replace 200 grammes of French beans, and

another 200 grammes of French beans are replaced by an equal quantity of boiled cucumber.

Fourth Day.—200 grammes of cabbage boiled in one water replace 200 grammes of cucumber.

Fifth Day.—30 grammes of lean meat are added to the diet along with 200 Cc. of clear broth.

Sixth Day.—Breakfast: Weak coffee 300 Cc., with thin cream 10 Cc., one egg, and raw lettuce 200 grammes. Lunch: Lean meat 100 grammes, cooked French beans 200 grammes, boiled potato 40 grammes. Tea: Weak tea 300 Cc., thin cream 10 Cc., one egg. Dinner: One egg, cooked cabbage 100 grammes.

Seventh Day.—A fast day.

Eighth Day.—30 grammes of cooked fat bacon replace 30 grammes of lean meat.

Ninth Day.—30 grammes cooked fat bacon replace 15 grammes of lean meat, 15 grammes of boiled potato added.

Tenth Day.—30 grammes of fat added.

Eleventh Day.—Breakfast: Weak coffee 300 Cc., thin cream 15 Cc., one egg, cooked fat bacon 30 grammes, raw lettuce 200 grammes. Lunch: Cooked lean meat 20 grammes, fat 15 grammes, cooked French beans or their equivalent 120 grammes, boiled potato 60 grammes, butter 15 grammes. Tea: Weak tea 300 Cc., cream 15 Cc., boiled potato 30 grammes, butter 15 grammes. Dinner: Clear broth 200 Cc., one egg, cooked cabbage 100 grammes, cooked French beans 100 grammes, butter 30 grammes.

Twelfth Day.—Add fat 30 grammes.

Thirteenth Day.—Add white bread 15 grammes, subtract raw lettuce 120 grammes. Add white bread 15 grammes at tea, and subtract 30 grammes of potato at lunch. Add butter 15 grammes.

Fourteenth Day.—A fast day.

Fifteenth Day.—Breakfast: Coffee 300 Cc., cream 20 Cc., one egg, cooked fat bacon 30 grammes, raw lettuce 100 grammes, white bread 15 grammes, butter 15 grammes. Lunch: Cooked lean meat 60 grammes, fat 30 grammes, cooked French beans 120 grammes, boiled potato

30 grammes, butter 60 grammes. Tea: Tea 300 Cc., white bread 15 grammes, one egg, butter 30 grammes. Dinner: Clear broth 200 Cc., one egg, cooked cabbage 120 grammes, boiled potato 30 grammes, butter 60 grammes.

The diet on the fifteenth day represents carbohydrate 42 grammes, protein 54 grammes, fat 192 grammes. Note that the carbohydrate is fairly well divided: breakfast 12 grammes, lunch 8 grammes, tea 9 grammes, dinner 13 grammes. The energy provided by the diet is calories 2112, sufficient for an average man who is not doing any manual work. If sugar remains absent the diet is altered by the addition of 3 grammes of carbohydrate daily with a diminution of 6 grammes of fat.

Every seventh day should be a fast day or a half-ration day; in the milder cases half-ration days suffice.

Under no conditions should we be influenced by the old-fashioned idea and add to the protein in the diet; if one does this, quite frequently sugar will return, and one may think that it is due to the increase in carbohydrate and diminish it in error. This means that no so-called antidiabetic bread or biscuits may be given.

When Leyton wishes to reduce the weight of obese patients he gives them an excess of protein; this applies to diabetics too—an excess of protein causes them to lose weight. Many years ago Leyton found that by substituting cellulose, which is not absorbed, for protein, patients stopped losing weight.

There is nothing gained by giving oatmeal instead of bread; as long as the carbohydrate is starch and not sugar its absorption is fairly slow; the type of starch makes no difference.

Various diets suggested during the last few months have the same underlying idea, although the authors of the diets frequently do not seem to recognize it—namely, the diminution in the quantity of protein.

The problem arises, What should be done when the sugar returns? The patient should fast until the sugar disappears; as a rule twenty-four hours suffice. Then one

of two methods may be adopted: the progressive diet may be followed, but at double the previous rate, until the carbohydrate reaches two-thirds of that at which sugar returned, and then fat is added until the necessary amount of energy is being taken. Or the diet is halved, then the protein is rapidly increased up to the amount it was when sugar appeared and the fat increased at the same time. The carbohydrate is gradually increased until it reaches two-thirds of the amount that led to the return of sugar.

We must realize that protein and fat in excess will both lead to the reappearance of sugar in the urine.

The reappearance of sugar after some time without any alteration in the diet does not necessarily mean that a fresh period of alimentary rest need be prescribed, or even that a modification in the diet is essential. Some emotional disturbance may have led to glycosuria. Amongst Leyton's patients is a woman who has a return of glycosuria whenever the interval between letters from her son, who is fighting in France, is more than five days. Mental perturbation does not always lead to the same results. In a severe case of diabetes, whose carbohydrate limit rose to 60 grammes of carbohydrate, had bombs dropped in his garden on two occasions; he lost his brother, sister, and wife, all within three months; but he did not have a return of sugar.

Exposure to cold, anxiety about catching a train, and many other minor things may lead to the return of sugar, and should be inquired about before any alteration in diet is ordered.

In olden days much attention was paid to the weight of the patient, and the unwarrantable assumption was made that so long as the weight was maintained all was well with the patient. Patients should be taught that the weight is of comparative unimportance, that no diabetic has ever faded away. Make them exchange an interest in weight for one in the result of the test of the urine with Benedict's solution.

As a rule the gain in weight when the patient is upon the optimum diet is very

slow, perhaps a few ounces a week. In the majority of cases a rapid increase means that edema is developing. An exception came Leyton's way a short time ago in a man who had gained 17 pounds in six weeks. For two years he had been upon the old-fashioned treatment, and had become a skeleton, and a weak skeleton at that. The death of his medical adviser had led to his adoption of the Allen treatment. He emphasized the rarity of the rapid increase in weight with completely beneficial results by making a somewhat unusual remark: "My doctor died; if he had not, I should."

In the past diabetics were not allowed to take much exercise, because it was thought that exercise would lead to loss of weight. It is found that a moderate amount of exercise allows the patient to metabolize more carbohydrate, and exercise is now ordered; the amount taken should be the same every day, otherwise it must be remembered that upon those days when less exercise is taken less carbohydrate must be included in the food.

The results obtained are better than those by any method adopted to date. We must remember that the treatment is not a cure, but that when carried out in the best possible manner a diet is found which allows the patient to live indefinitely, and to lead a useful life. Perhaps a cure will be discovered during the next few years which will allow us to permit the patients whom we have kept alive to return to a normal diet.

The treatment has not been in use long enough for us to have decided whether the carbohydrate tolerance gradually increases. In some cases Leyton believes there are indications of this.

Young people who have developed the condition comparatively recently derive the most benefit from the treatment.

Of the seventy cases of severe disease which have come under Leyton's observation, four have died from tuberculosis. These led him to exclude those who showed signs of that condition. He hopes shortly to record what he believes to be the most

satisfactory treatment when tuberculosis is present.

One patient died from pneumonia, two from gangrene which had started some time before they came under treatment. Four patients died within a day or two of admission to the hospital.

The majority are enjoying good health, and many are asking why they were not put upon the treatment a long time ago.

ARTIFICIAL PNEUMOTHORAX: A PLEA FOR PARTIAL COMPRESSION OF THE LUNG.

In the *Southern Medical Journal* for February, 1917, HENDRICKS states in an article on this topic that after measuring his experience and severely criticizing all literature on the subject, he determined to try to obtain the same results by partial compression that he had obtained, and that others have obtained, by complete collapse. He finds that the clinical symptoms disappear in most cases as readily in partial collapses as in complete collapses. He finds that the patient's general condition improves in turn just as readily. He also finds that the sputum is reduced just as surely, but not so quickly. He has cited the results in hemorrhage cases by the use of light compression. He also notes that by partial compression the activity of the lung is greatly limited, thereby producing more than an appreciable immobilization without rendering that lung unfit for the performance of its function at a future time.

The disadvantages of partial collapse are few. They are as follows:

First, refills are necessary more often.

Second, these patients must be studied and examined very closely, both by physical examination and the fluoroscope, in order to determine the time for refills.

Third, the frequency of the refills requires only that one be careful of his technique, as the more often the pleura is entered, the more liability there is to infection, air embolism, and pleural shock. Air embolism and pleural shock scarcely need be taken into account, because air embolism will not

occur if the air is not turned on unless the oscillations of the manometer so indicate. Pleural shock is prevented by local anesthesia. The only thing left then is infection; and here again medical men doing this operation must become modern surgeons in the strictest sense of the word.

Hendricks is quite in accord with the view that there are cases in which nothing less than complete collapse will suffice. Fortunately, however, since he has resorted to partial collapse he has encountered no such cases.

The advantages of this method are:

First, the results are the same clinically.

Second, partial collapse may be used alternately in either lung or at the same time in both lungs, if the case so demands.

Third, there is less tendency to pleural effusions.

Fourth, there is very little strain thrown upon the right heart.

Fifth, there is no disturbance of the mediastinum.

Sixth, there is less danger of spontaneous pneumothorax.

Seventh, there is less danger of rupturing an abscess into the pleural cavity.

Eighth, when the disease is arrested we have the unaffected portion of the lung performing its function.

For the reasons already set forth as well as the highly satisfactory clinical results obtained, Hendricks can see no reason for other than partial collapse of the lung except in extreme cases.

EPIDEMIC VAGINITIS IN CHILDREN.

RACHFORD (*American Journal of the Medical Sciences*, February, 1917) states that the methods ordinarily used for the differentiation of the gonococcus from other forms of epidemic vaginitis have not been sufficiently perfected to make them absolutely reliable. Vaginitis is recognized as one of the most prevalent affections in our large cities, this being especially true in hospitals and other institutions which care for female children. The collective report of a committee to study this subject

indicates that the disease is on the increase and suggests that the means in vogue for the cure of this disease and preventing its spread are quite unsatisfactory. The disease very rarely is conveyed to adults. Transmission is almost never by sexual contact. The time required for a cure varies from six weeks to six months. A large proportion of apparently cured cases exhibit relapses. Complications and sequelæ of epidemic vaginitis in children are much less common than gonococcus complications and sequelæ in the adult.

The simpler methods of treatment, such as irrigating the infected parts once a day with two parts of a normal saline solution, followed by the injection of 2 or 3 ounces of a 1-per-cent solution of nitrate of silver, are more efficacious than the more severe forms of treatment involving the direct application of strong astringents and antiseptics to the vaginal vault and neck of the uterus. The intractability of the cases in the hospital wards is largely due to reinfection.

TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

WALKER and HALLER (*Arch. Int. Med.*, 1916, xviii, 376; quoted in the *American Journal of the Medical Sciences*, February, 1917) report 75 patients with central nervous system syphilis treated with 450 intraspinal injections of salvarsanized serum and with 350 intravenous injections of salvarsan. At first only salvarsan intravenously was used, and a few patients improved rapidly. However, in many cases little or no improvement followed from three to six injections, so these patients were then given intraspinal salvarsanized serum in conjunction with the salvarsan, and they improved rapidly under the combined treatment (Swift-Ellis method). As the intraspinal treatment seemed to reinforce the salvarsan the authors desired to determine what results would follow the intraspinal method alone. For this method they selected patients with a negative Wassermann reaction in the serum and with positive findings in the spinal fluid. The

ults from this method closely paralleled, e from the double method. Therefore, following rule has been adopted at the er Bent Brigham Hospital: Patients are treated with intravenous salvarsan. If satisfactory results do not follow three or r such treatments, they are then given aspinal salvarsanized serum in conjunc- with intravenous salvarsan. Those .have a negative reaction in the serum given only intraspinal salvarsanized m.

o thirteen patients were given five or e intravenous injections of salvarsan e. Four of these patients, three with brospinal syphilis and one with syphi- meningitis, had very recent infections were relieved of their symptoms. The aining nine patients had older infec- s, and they showed little or no improve- t in their symptoms and no improve- t in the spinal fluid findings. To thirty ents were given three or more double (rift-Ellis) treatments, and marked im- vement followed in each case. Thirteen ents who were previously incapacitated e restored to working capacity; of teen with ataxia, eight were relieved, were markedly improved, and five more e much improved. Seventy-five pa- ts showed improvement in the spinal d Wassermann reaction; in ten cases amounted to from 0.3 to 0.5 Cc., and five other cases the reaction became ative with 1 Cc. The spinal fluid cell nt became five or less in twenty-five es.

n four cases a period of two years has osed since treatment without any return symptoms, in three others a period of teen months, and in eight others six nths or more. Four patients have shown e form of relapse. One with tabes had elapse in ataxia, two with general paresis the insane had a temporary relapse in ntality, while one with cerebrospinal hilis developed a weakness in the legs bably of cerebrospinal origin.

Seventeen patients were treated intra- nally with salvarsanized serum alone, d all were markedly improved or relieved

symptomatically. Nine who were pre- viously unable to work were restored to working capacity. Of the seven patients with ataxia, four, previously unable to work at all, became able to work, and in the other three in whom the ataxia was not so marked there was great improvement. The Wassermann reaction in the spinal fluid be- came negative with 1 or 2 Cc. in eight cases, and in five others it was improved from 0.3 to 0.5 Cc. The spinal fluid cell count became normal in nearly every case. Two patients with syphilitic meningitis were relieved in every way. Seven patients have been observed twelve months since treat- ment was stopped, and four others for six months or more, and they show no return of symptoms. One patient with cerebro- spinal syphilis had a return of headache after eight months, and two with tabes had a slight relapse in ataxia, which rapidly cleared up immediately following a treat- ment. In one patient a provocative Wasser- mann reaction occurred in the spinal fluid following the administration of salvarsan, and in two cases a provocative reaction occurred in the spinal fluid following intra- spinal treatment. Two patients with re- peatedly negative reactions in the serum while under intraspinal treatment developed a positive reaction in the serum about the time the spinal fluid reaction became nega- tive with 1 Cc.

Improvement in symptoms following treatment seemed to parallel fairly closely the drop in the cell count, and those patients with high cell count seemed to improve and the cell count dropped more rapidly than occurred in those cases with low cell count. The only physical sign which was changed in these cases was that a positive Romberg in one case became negative. More benefit seemed to follow moderate after-treatment reactions than when no reaction occurred. Severe reactions are undesirable and may be avoided by less frequent treatments. In this series of cases no fatal or disturbing results followed treatment. The total num- ber of cells in the spinal fluid did not vary as a rule. In a few cases of tabes, during severe crises of pain, and in cases immedi-

ately following too frequent and too large intraspinal injections of salvarsanized serum, the cell count temporarily increased.

In their conclusions the authors state that patients with recent syphilitic meningitis and cerebrospinal syphilis may be relieved symptomatically by intravenous salvarsan; the spinal fluid Wassermann reaction may become negative with 1 Cc. and the cell count may become normal. Patients with long-standing cerebrospinal syphilis and tabes may be benefited symptomatically following salvarsan intravenously, but little or no change occurs in the spinal fluid findings. Patients with recent and those with late syphilitic meningitis, cerebrospinal syphilis, tabes, and general paresis of the insane are markedly improved following the combination of intravenous salvarsan and intraspinal salvarsanized serum (Swift-Ellis method), and those who fail to improve under salvarsan alone do improve both in symptoms and in spinal fluid findings following this double treatment. That intraspinal salvarsanized serum greatly benefits patients with central nervous system syphilis is shown by the fact that those with negative serum reactions and with positive spinal fluid findings are symptomatically relieved by this treatment. In many patients the spinal fluid Wassermann reaction becomes negative with 1 Cc., the cell count becomes normal, and a negative (Noguchi) globulin test is obtained following sufficient treatment with salvarsanized serum intraspinally without other medication.

SURGERY OF THE BILE PASSAGES.

GIL (*Surgery, Gynecology and Obstetrics*, February, 1917) summarizes the cases of biliary lithiasis treated in the surgical clinic of the Hospital of Medellin, drawing the following conclusions:

Calculus of the gall-bladder or in the cystic duct cannot produce icterus.

The icterus which appears with colic, or a little later which disappears totally and does not return unless with colic, signifies the passage of a calculus.

Persistent icterus of varying intensity but most intense during colic, and which partly disappears, signifies obstruction of the common duct by calculus.

Persistent icterus each day more intense and accompanied by colic signifies complete obstruction of the common duct by retained calculus.

Persistent icterus without a history of painful crisis or subsidiary symptoms, which is not accompanied by colic, signifies compression of the common duct more commonly by a tumor of the head of the pancreas.

With regard to the gall-bladder, the author reaches these conclusions:

In obstruction of the cystic canal the gall-bladder is distended, the bile which it contains is resorbed, and the inflammation increases the quantity of mucus. There is easily observed external tumefaction, sensible on palpation, but there is no icterus or liver hypertrophy.

If there is grave infection the contents become purulent; the dilatation and the external tumor progressively increase; there is great sensibility, muscular resistance, and hepatoxic fever.

In partial or complete obstruction of the common duct, the gall-bladder being healed and the cystic duct permeable, the liver increases in size and the gall-bladder distends. Sometimes in this way an enormous tumor reaching to the iliac crest is formed. However, in the great majority of cases (80 per cent) the gall-bladder has previously been the site of a chronic inflammation and on this account is commonly small.

With symptoms of obstruction of the common duct the gall-bladder appears contracted in 80 per cent of cases of biliary lithiasis, and dilated in 90 per cent of cases of compression by tumor.

All the above conclusions are of great value in differential diagnosis.

Surgical treatment according to the author is indicated (1) in frequent attacks of colic; (2) in dyspeptic disturbance produced by lithiasis; (3) in cases of dilatation of the gall-bladder by obstruction of the cystic duct; (4) in complication

vesicular empyema, vesicular rupture, etc.; (5) in recurrent cases; (6) in cases of chronic icterus by common duct obstruction, within certain limitations, however; (7) in cases in which the diagnosis is obscure and exploratory celiotomy is desirable.

The indications for cholecystostomy are: (1) when the gall-bladder is relatively healthy and the cystic duct permeable; (2) in cases of empyema and angiolocolitis if the passages are permeable; (3) when the gall-bladder is much inflamed and adherent and the patient unfitted for a radical operation.

Indications for cholecystectomy are: (1) when the gall-bladder is the site of severe inflammations and is adherent, contracted, and the mucosa ulcerated; (2) when the gall-bladder is contracted upon a calculus and the cystic duct obstructed; (3) in certain cases especially in order to cure an external fistula; (4) in association with choledochostomy or hepatostomy when imperative.

BLOOD CHEMICAL METHOD IN THE ESTIMATION OF RENAL FUNCTION.

GRADWÖHL (*Urologic and Cutaneous Review*, February, 1917) refers more particularly to the work of Folin and Denis, Benedict and Lewis, and others, using colorimetric determinations and dealing with small quantities of blood, which he states are easy and speedy. There are three substances of special interest regarding kidney function, namely, urea nitrogen, uric acid, and creatinin. The normal amount of total non-protein nitrogen per 100 Cc. of blood is 25 to 30 grammes; of urea nitrogen 12 to 15, of uric acid 1 to 3.0, and of creatinin 1 to 2.5. Urea comes from food (exogenous) derived from the nitrogenous portions of the food, some of which is stored up as amino-acids, others being converted into ammonia and eliminated. Uric acid is partly endogenous and partly exogenous, about half and half. Its derivation from food can be traced from purin, a conversion into xanthin, and finally to uric acid, it being diaminoized before change to

xanthin takes place. Creatinin is entirely endogenous in origin; it is constant hour by hour in blood and is not increased at all by protein food intake. Uric acid is the most difficult to eliminate; urea stands next in point of difficulty of elimination, and creatinin is the easiest for the kidneys to get rid of. Expressed in numerical terms, it takes twenty times more work for the kidney to eliminate its urea than its creatinin.

In uremic nephritis we see the very highest concentration of these ingredients. The quantities of these ingredients in blood stand in no relationship at all to the presence of pathologically formed substances in urine such as albumin, casts, or urea.

We assume that the cause of the severe symptoms in nephritis is impending or advancing uremia, and that the cause of the uremia is resident in deficient elimination through kidneys. Whether the ingredients in blood which we are analyzing represent the substances themselves that produce the toxic symptoms, or whether they are simply an index of the toxemia, is of but little importance for the purpose in hand. We have in an analysis of this kind the surest method of determination by laboratory methods of deficiency in kidney function.

The elimination of kidney function by determination of the ease and speed with which a chemical dye can be eliminated through them seems somewhat rash, in theory and in practice. The author confines his remarks more particularly to the functional tests of Geraghty and Rowntree, for of all the color-producing substances that are used in kidney functional tests it seems to be the most commonly used because of the ease of administration, the harmlessness of the procedure, and the rapidity of making the test and obtaining the data required. Within certain limitations it gives a fairly good picture of kidney function, still it manifestly cannot give the observer the same intimate picture of metabolic processes and real kidney efficiency or deficiency which goes with a complete blood chemical analysis.

The work of Folin, Fitz, Frothingham and Denis, on "The Relation Between Non-

protein Nitrogen Retention and Phenolsulphonephthalein Excretion in Experimental Uranium Nephritis," gives a very good view of the exact value of each method of investigation from a purely experimental standpoint. These experiments showed that there was a wide difference in the figures of the phthalein test and the blood chemical data; that at the beginning of the nephritis the phenolsulphonephthalein elimination dropped more rapidly than the accumulation of non-protein nitrogen and urea of the blood. During the course of the disease the height of the nitrogenous accumulation is reached from two to three days later than the lowest level of the phenolsulphonephthalein excretion. Non-protein nitrogen and urea accumulated in the blood and returned to normal gradually, in these rabbits, as recovery of the kidney occurred. These observers maintained that in general these two tests parallel each other, but with this essential difference: the amount of phenolsulphonephthalein excretion showed the kidney function at the moment; the amount of non-protein nitrogen and urea in the blood is rather a measure of an accumulating difference between the amounts of waste nitrogen produced in the metabolism and the amounts eliminated by the kidneys. The time element, the duration of the condition, constitutes therefore a most important factor in the comparison of these two tests. The phthalein test indicates the function for the moment, the blood chemical tests indicate the true grade of the working power of the kidneys. There are many cases with little or no phthalein excretion that are badly deficient and would show high retention of these non-protein nitrogenous blood constituents; we know also that there are some cases with decreased phthalein output that are functioning quite well, viewed in the light of the non-retention of these ingredients of blood; we also know that there may be a normal phthalein output and a marked retention of the blood constituents.

There are records showing extensive changes in kidneys without urinary change; very definite retention of urea, uric acid,

and creatinin. Other data show that in the presence of a rather low phthalein output kidney function may be unimpaired so far as retention of the non-protein nitrogenous constituents is concerned.

Occasionally hyperfunction, however, may accompany severe disease and may be very misleading. Foster called attention to the high figures of phthalein output in persons dying with uremia. Unfortunately, the investigators who have worked with these various methods have failed to make sufficiently searching researches upon all the important blood constituents.

The author emphasizes the necessity of determination of the percentage of uric acid in early interstitial nephritis. As pointed out by Fine, possibly the earliest indication of interstitial nephritis is the retention of uric acid. We know that this retention of uric acid is characteristic of gouty conditions, of course, a retention that is of a permanent nature. Fine called attention to the similarity in the findings in gout and early chronic interstitial nephritis. As the case progresses in severity, we find the urea nitrogen accumulating; and lastly, in the extreme stages, we find an accumulation of creatinin. Creatinin accumulations, therefore, indicated severe kidney derangement of function. The striking fact first called to the attention of the profession by Myers that a creatinin retention of 5 mgms. or over indicates a probable early fatal termination of the case, deserves special consideration at the hands of a surgical group, such as are urologists. In Myers's experience, no individual who has attained a figure of 5 mgms. or over of creatinin has ever recovered. We have, therefore, in this one blood constituent a most important prognostic guide and one that should be earnestly investigated in daily work. In one case was found a very high degree of creatinin retention—over the fatal point—and a normal phthalein output.

Another factor which the author believes ought to be considered is the estimation of sugar in the blood. Since the use of the modern microchemical methods of blood-sugar estimations it has been found that

conditions of hyperglycemia and glycosuria do not go hand in hand. We may have glycosuria without hyperglycemia, notably in renal diabetes. We may have glycosuria and hyperglycemia, and again we may have hyperglycemia without any glycosuria. The threshold point in blood-sugar accumulation before glycosuria appears is generally stated to be in the neighborhood of 0.18 per cent, yet we have a record of a case of diabetes mellitus under starvation with 0.20 per cent blood sugar and no glycosuria. The particular point which the author wishes to make is that there is often a concomitant hyperglycemia with nephritis without any glycosuria, and that this excess of blood sugar indicates a complicating diabetes mellitus which must be reckoned with in considering operative risks and in forestalling acidosis. Blood chemistry must be looked to, therefore, with respect to sugar analysis in the broadest consideration of the metabolic conditions of these surgical cases.

TOXICITY OF THE PRESENT SUPPLY OF SALVARSAN AND NEOSALVARSAN.

ARMSBY and MITCHELL (*West Virginia Medical Journal*, January, 1917) report on the variations of the German importation of 1916.

The water used is distilled in Jena glassware from distilled water furnished by the Consumers' Company. Each morning the water is distilled and collected in Jena flasks of 500-Cc. capacity. The flask is capped with gauze, then put over the flame and kept there until the boiling point is reached, after which it is set aside to cool. The water remaining is redistilled on the following day. The sodium hydroxide solution is prepared in small quantity, at frequent intervals, from chemically pure sodium hydroxide and redistilled water, in a sterile Jena glass Erlenmeyer flask, which is stoppered with rubber. Before the preparation of the salvarsan solution, all the glassware is carefully sterilized and then rinsed with redistilled water. The neutralization is accomplished with minute care.

The water is used in dilution, representing 0.1 gm. to each 25 Cc.

The authors were struck by the vasomotor phenomena accompanying or following the injection as soon as they began to use the new supply of salvarsan. In a few seconds after the flow of the solution into the vein had begun, the patient complained of a strong and sickening odor of ether. Marked generalized erythema, and in some cases urticarial wheals, appeared, as did lacrimation, with some respiratory embarrassment and a feeling of constriction about the chest. The pulse also became rapid and weak. In a few cases there was nausea and vomiting. The reaction lasted from one to three hours, the nausea for twenty-four hours. Six patients thus reacted. The entire quantity of salvarsan was returned to the New York agents in exchange for other ampoules. The reactions continued with the new lot, although much less frequently.

Neosalvarsan was then substituted. In the department of dermatology and syphilis at Central Free Dispensary of Rush Medical College a group of sixty-three patients was given 127 injections of salvarsan. In this group there were twenty-eight severe reactions, consisting of slight nausea, with occasional vomiting, after leaving the dispensary and during the night. The most toxic ampoule found was marked B. M. B., and all of the severe reactions occurred with this control mark. The dosage was in all cases 0.4 gm. or less.

The new shipment of neosalvarsan was found to be much less readily soluble than the former product and tended to form a gelatinous mass when added to the water. As a rule it became necessary to triturate the mass before it would go completely into solution. In two cases urticarial wheals followed each injection. Some of these patients had received numerous injections of other arsenical preparations without reactions. Nearly all now complain of the increased odor and taste which occur immediately after the flow begins, and which in some cases continue for twenty-four hours. The technique of salvarsan consists

in adding a full dose to 30 Cc. of water prepared as described and injecting by a gravity method. Epinephrin, though it can do no harm, is apparently without value.

CARREL'S METHOD OF TREATING INFECTED WOUNDS.

An excellent summary of this method is given by STRUTHERS (*Edinburgh Medical Journal*, February, 1917). The value of eusol and other preparations of hypochlorous acid is now generally recognized in the treatment of infected wounds. Excellent results have been recorded with the former both by continuous and intermittent applications of the antiseptic to the wound surfaces.

Desfosses (*La Presse Méd.*, Nov. 30, 1916) describes the details of the technique employed by Carrel:

The first step in the technique in cases of badly infected wounds is to open up freely the wound and all its recesses, to extract foreign bodies, and to excise necrosed or putrefying soft parts. After mechanical cleansing of the wound the object of the method is to sterilize the wound surfaces by the more or less continuous application of a suitable antiseptic, which is brought into intimate contact with all the raw surfaces. Solutions of hypochlorous acid or of hypochlorites, such as Dakin's solution, can render an infected wound aseptic, destroying the organisms without injury to the cells of the tissues. Formerly, surgeons employed antiseptics which were either too strong or too weak to be effective, and the duration of their application has been too short to destroy the organisms. Lavage of the wound is therefore the essential feature of Carrel's method. The effect of the treatment can be judged by the clinical features of the case and by bacteriological examination of the secretions from the wound.

The lavage of the wound may be continuous or intermittent, the hypochlorite solution being brought in contact with all the surfaces and corners of the wound by means of fine perforated rubber tubes. As

the amount of fluid used is small no special arrangements are necessary to collect the fluid, which is absorbed by the dressings and evaporates. Intermittent lavage is more commonly employed than continuous irrigation by means of the drop method.

Red rubber tubes, with an interior diameter of 4 mm. and with walls of 1 mm. thickness, should be employed; it is necessary for the tubes to be flexible and sufficiently resistant to avoid occlusion by the pressure of the soft parts. The length of the tubes varies from 15 to 40 cm. Some are closed at one end by a ligature, and are perforated with numerous small openings for a distance of 5 to 15 cm. from the closed end. Eight small holes should be allowed for every 5 cm. of the tube, and these should be $\frac{1}{2}$ mm. in diameter. The simplest way to perforate the tubes is by means of a punch of 2 mm. diameter. Other tubes are kept open at both ends, the central part only being provided with holes, and the fluid enters the tube at either extremity. In some cases it is advisable to have the perforated tubes surrounded by a layer of absorbent gauze. While the perforated tubes are kept in uniform length, a tube can be lengthened, when desired, by joining to an additional piece of rubber tubing of the same caliber by means of a glass connection, which is 25 mm. in length and 4 mm. in diameter. The wound is irrigated by means of a glass reservoir suspended above the bed and connected with the perforated tubes within the wound by a rubber tube and intervening glass cannula. Several varieties of cannulae are required according to the number of tubes employed in irrigating the wound. The reservoir should have a capacity of one liter, and should be fixed at a height of one meter above the level of the bed. The dependent outlet should have a diameter of 7 mm. and to this is attached a rubber tube of 4 mm. diameter and $1\frac{1}{2}$ or 2 meters in length. The latter tube is connected by means of a glass cannula to the perforated tubes in contact with the wound surfaces. When only one perforated tube is necessary the connecting cannula should be conical, 2

cm. in length, the interior diameter of the ends being 7 mm. and 3 to 4 mm. respectively. When two tubes for lavage are needed, or if irrigation through both ends of a single perforated tube is desired, the cannula should be Y-shaped. In the case of large wounds three to six perforated tubes may have to be provided for, and special glass cannulae are needed; for example, in a case requiring four tubes the cannula should be 6 to 7 cm. in length and the lumen 4 mm. in diameter; the distal end of the cannula is closed; from one side of the cannula four branch connections project at right angles, so that the cannula has the appearance of a comb; the lateral connections should be 2 cm. long, and have a diameter of 3 to 4 mm., so that they can be attached to the perforated tubes. A small metal clip is applied to the rubber tube which descends from the reservoir; the flow of antiseptic can thus be interrupted or liberated as required.

As it is important to bring the antiseptic in intimate contact with the wound, the perforated tubes must be carefully arranged on the wound surface without any intervening dressings.

When the wound is situated on the anterior aspect of the body, and practically horizontal, the arrangement of the tubes is comparatively easy. If the wound is inclined the tube should be placed along the upper border so that the solution will flow over its surface by the action of gravity. One or more perforated tubes with the ends closed may be used, or, as mentioned above, a single tube with perforations in the middle portion may be employed in the form of a ring by attaching the ends to a Y-shaped cannula. The latter arrangement is useful in cases of septic stump after amputation; the shape of the loop thus formed may be modified, according to the shape of the wound, by tying together the limbs of the loop with a thread. The tubes should be kept fixed in position by a strip of plaster at the edge of the wound and by gauze swabs soaked in Dakin's solution applied on the top of the tubes over the surface of the wound.

In the case of perforated wounds with two openings the antiseptic is readily brought into contact if the axis of the wound is horizontal, but if the line of the wound is more or less vertical it is advisable to cover the tube with a layer of gauze, otherwise the antiseptic will escape too rapidly from the lower opening and the wound will not be sufficiently bathed.

When a wound presents a single orifice the method to be adopted will depend on the position of the opening. If this is above, a tube with a single comparatively large opening near its end is inserted to the depths of the wound; the cavity of the wound will then be easily filled with the antiseptic and a rapid sterilization is favored, provided that there is room for the fluid to escape, when a fresh irrigation is made. If the orifice is dependent it is necessary either to surround a perforated tube with gauze, in order to maintain contact, or to employ simple perforated tubes and to inject the fluid under increased pressure. The facility with which the fluid drains off in cases like the above militates against a rapid improvement, such as can be expected when stagnation is more readily obtained. When the orifice is on the lateral aspect of the body a certain amount of stagnation can be achieved by the pressure of gauze swabs placed over the opening of the wound, and by altering the position of the patient.

Similarly in the case of large wounds with several orifices, the solution tends to escape too rapidly by the lowest-placed openings. Tubes perforated for 10 or 15 cm. should be introduced into all the recesses of the wound and as deeply as possible. In order to keep the tubes pressed against the soft parts gauze compresses should be placed in the center of the wound.

After arranging the tubes in the desired position gauze swabs soaked in Dakin's solution should be placed on the surface of the wound. These help to maintain the position of the tubes. It is necessary to insure that the perforated parts of the tubes are within the limits of the wound, as otherwise the antiseptic solution would

escape over the skin and be wasted and possibly harmful. The non-perforated parts of the tubes should extend for at least 15 cm. beyond the wound.

The skin surrounding the wound can be effectively protected from irritation by the hypochlorite solution by application of lint sterilized in vaselin. This is especially valuable in protecting the skin of the back and the posterior surfaces of the limbs.

The dressing recommended by Carrel is partly composed of absorbent, and partly of non-absorbent, cotton-wool arranged in two layers and covered on the surfaces by layers of gauze. The dressing is applied so that gauze and a layer of absorbent wool is next the wound surface. The non-absorbent gauze prevents the solution from escaping on the surface but does not prevent evaporation. No oiled silk or water-proof tissue is used.

The dressing is wrapped round the limb and fixed with safety-pins, no bandage being necessary; the wound can readily be exposed without disturbing the patient. Special openings can be made in the dressings so that the tubes can conveniently enter the wound, and when several tubes are required they can be connected to the reservoir by means of a branched cannula, as already described. The dressings should be renewed every twenty-four hours, but if there is much soakage the outer coverings can be shifted without disturbing the position of the tubes at any time. The mattress should be protected by a water-proof sheet; but this is only a precautionary measure, as the irrigation should never be so free as to damp the bed.

Intermittent irrigation of the wound is to be preferred in most cases to continuous, because where there are several openings in a large wound the fluid is apt to run out if the flow is continuous.

The routine method is to irrigate the wound once every two hours. This can be done in a large number of cases with little trouble by the nurse, who has simply to release the clip on the outflow tube for a few seconds. The pressure within the tubes causes the fluid to escape in jets from

the perforations. The quantity thus injected varies from 20 to 100 Cc., and when properly done there should be no irritation of the patient or of the bed. The amount of fluid required for a single day in the twenty-four hours will vary from 250 to 1200 Cc., according to the extent of the wound.

After the wound has become aseptic it can be closed by suture or by adhesive plaster. Before deciding on closure the number of organisms must have steadily diminished, and for three consecutive days should have disappeared from the discharge. Secondary suture can usually be performed from the eighth to the eleventh day.

THE PHENOMENA OF ANAPHYLAXIS

WYARD (*Lancet*, Jan. 20, 1917) regards this topic as timely because of the extensive use at the present time of prophylactic and therapeutic injections of antisera. Anaphylaxis has been recognized since the work of Rosenau and Anderson in 1907, but was usually of little importance clinically on account of the minute quantities of bacterial protein used for vaccination purposes, the amounts insufficient to make a toxogenic dose. In the case of diphtheria antitoxin the matter is quite otherwise and is of considerable moment, since there have been many cases reported of severe illness after injection of this serum, some ending fatally. Moreover, it has a direct bearing upon prophylactic injections against tetanus, these being given to every man wounded in battle, and it is deemed desirable to give prophylactic doses, or, symptoms of tetanus being manifest, larger therapeutic doses. The medical officer must decide as to the possibility of anaphylaxis following, either trust to luck that no ill effects are produced or take antianaphylactic measures.

There is no satisfactory definition of anaphylaxis. The condition may be provisionally described as an increased sensitiveness of the animal organism to a foreign protein, so that injections of the latter in small amounts which are innocuous to control

produce in the hypersensitive animals symptoms of varying intensity and even acute death. Such a state of hypersusceptibility may be idiopathic to the individual in a few rare cases, while in others sensitization may be accidentally effected in ways which are only now coming under suspicion. The term is usually employed to denote the acute shock seen in animal experiments, the serum disease of man, and some diagnostic reactions such as those with tuberculin, mallein, etc. Anaphylaxis may be effected by any protein substance. In conformity with the general terminology of immunity these substances are called antigens. Moreover, all antigens are protein in nature, and it is almost conclusively proved that no body other than protein is capable of acting as an antigen.

The amount of protein required by the first dose varies within wide limits, sensitization having been effected by extremely minute quantities, even as small as 0.000001 Cc., and there is apparently no limit in the other direction so long as it be not in itself incompatible with the life of the animal. The second or toxic dose may likewise vary indefinitely upwards, but the minimal dose is at least 100 to 1000 times larger than that for sensitization, and is for guinea-pigs some 4 to 5 Cc. These figures refer to such antigens as possess no inherent toxic properties. The hypersensitive state does not supervene immediately upon the sensitizing injection. The average time for a moderate sized dose is from twelve to fourteen days. After a massive first dose sensitization may be more or less delayed.

The sensitizing dose may reach the physiological interior of the body by any method. Thus it has been shown that protein fed to animals in large quantities is later demonstrable in the blood. Later gastric and pancreatic digestion will so alter the constitution of such substances that no sensitization is possible except in abnormal circumstances where the processes of digestion are interfered with, when it appears that unaltered protein may pass into the large gut, be there absorbed to some extent, and so sensitize the animal. In the case of

toxogenic dose greater variability prevails, and antigen administered by the mouth or per rectum never produces anaphylactic shock, for which purpose parenteral injection must be employed. The most certain methods are intracerebral and intravenous injections, next intramuscular, then intraperitoneal, intrapleural and subcutaneous, and finally intrathecal. The intracerebral route seems less suitable for sensitization than the other routes; but if the toxogenic dose be given in this way, the shock appears sooner and in greater intensity than in other circumstances.

The anaphylactic reaction resembles all other immunity reactions in its specificity—i.e., specificity is not absolute. There is a suggestion that all antigens give rise to the same poison. A non-specific antianaphylactic (refractory period) may be produced in the hypersensitive animal with peptone. The same animal may be at one and the same time sensitized to a number of different antigens.

The essential features of anaphylaxis are shock, very sudden onset, increased respiratory rhythm, marked muscular weakness and irregularity and labored respiration, and death in convulsions or coma. Urine and feces are often involuntarily discharged—this in laboratory experiments. It appears to be due to a toxic substance in the elaboration of which the liver plays some part and its action is probably not central, but peripheral, upon the nerve endings or the muscles themselves. In dogs the effects are practically limited to the vascular system, and the action of the vasomotor nerve endings causing a paralysis. The precipitins are supposed to be a prime factor in the production of the condition. A transference may take place by means of the placental circulation and not by the milk. The condition may endure for many years.

Closely allied to, if not identical with, the phenomena described above is the serum disease of man, which may assume either of three forms. The first to be described is that occurring after a single large dose of serum, and symptoms appear eight to twelve days after the injection; the commonest

being urticaria, often involving a large part of the surface area, sometimes practically all. Other rashes—morbilliform or erythematous—are sometimes, but more rarely, seen. At the same time joint pains are common, and there may be swelling and tenderness of the lymphatic nodes associated with the site of injection. Some pyrexia and occasionally slight albuminuria may be associated. The symptoms pass off in from twelve to forty-eight hours. The second form is the accelerated reaction; it appears four to eight days after the second injection, and does not occur after a first injection. The symptoms are similar to those just described, but are more acute, and generally pass off within twelve to eighteen hours. As a rule neither of these forms is of serious import, but now and then may be very severe or even fatal.

The third form is an immediate reaction and is the same as that seen in experimental animals. The symptoms supervene within a very short time of the second injection. It is interesting to note that man is less susceptible to anaphylaxis than guinea-pigs, and more so than mice. The symptoms produced in man approximate closely those seen in guinea-pigs, and the pathology is probably essentially the same in both cases—*i.e.*, an extreme contraction of the bronchioles so that no air can enter the alveoli. There may be in addition hemorrhages. The symptoms usually come on in half an hour. First, local pain and tenderness, and the site of injection becomes swollen, red, and hot. The swelling may be very marked, and where the upper arm is used may extend from shoulder to wrist. Irritation with an intense desire to scratch the part may be a prominent symptom. The systemic phenomena may be intense without any or all such local changes. Suppuration never occurs and the part becomes normal within twenty-four to forty-eight hours. Almost at once the patient complains of difficulty in breathing, the chest becomes expanded and almost rigid, inspiration is particularly impeded, the face may become swollen and congested, the mucous membranes cyanosed. Auscultation shows the normal

vesicular breath sounds replaced by a high pitched bronchovesicular murmur. Murmurs are not heard. Extreme urticaria may be seen at the same time. In cases slightly less severe the patient will sit laboring for breath and racked by a frequent, almost continuous or paroxysmal dry cough. Relief comes as suddenly as the onset, and in fifteen to thirty minutes the patient is to all appearances normal.

Friedberger has found that blood of an animal showing symptoms of anaphylaxis possesses no, or very little, complement, that the condition is not due merely to a lack of complement.

Complement is able to form from antitoxin a toxic body which, injected into a normal animal, gives rise to all the phenomena of anaphylactic shock.

On general principles it may be assumed that any one who has received one or more injections more than fourteen days previously is sensitized. A massive first dose does not cause antianaphylaxis, nor does the administration of lecithin. Starvation is efficient, at least in laboratory work.

Hypersensitive animals deprived of food and allowed only water for four to five days are at the end of that period refractory to a second dose of antigen.

Vaccination against anaphylaxis may be employed by the injection of small doses of antigen during the incubation period, but to be effective these must be given late in the period, about the seventh, eighth, or ninth day, and have no such protective action if administered early—*i.e.*, about the third, fourth, or fifth day. If 5 to 10 Cc. of antigen be given into the rectum, this having been thoroughly cleansed out, the individual is rendered refractory from ten to twelve hours later, and further subcutaneous injections may be carried out with impunity. The antigen is very slowly absorbed when given by this route, which is probably the reason for the subsequent desensitization, it having been found that if the antigen be administered subcutaneously in such a manner as to insure an extremely slow entry—*e.g.*, after the fashion of a subcutaneous saline infusion—v

large amounts may be tolerated, which if given rapidly in the usual way would certainly cause death. Both these methods are inconvenient and time-consuming. In considering the phenomena of hypersusceptibility it is seen that the effective toxogenic dose is very considerably greater than the sensitizing—that there is a definite minimum below which the antigen fails to elicit anaphylactic shock. This fact is made use of, for by the injection of such a subminimal dose the individual is thereafter rendered refractory for a time, during which further and even large doses may be safely given.

In man sensitization rarely if ever reaches such intensity as to cause reaction with 1 Cc. of blood serum, so that in the use of diphtheria or tetanus antitoxin, if it be considered unsafe to inject a large dose at once, 0.5 to 1.0 Cc. may be used as a preliminary injection, followed five or six hours later by any further dose that may be considered necessary. Should even greater rapidity be desirable, such a preliminary dose may be followed in five or ten minutes by a larger and every five minutes or so afterward by steadily increasing amounts, whereby in a very short time enormous doses may be given and without risk of anaphylactic shock. In the case of tetanus antitoxin where prophylactic doses are given, these are practically all innocuous. The amount of serum actually employed varies from 3 to 5 Cc., according to the concentration of the sample. An interval of anything up to five weeks between two such doses will never give rise to symptoms. About the sixth week, however, hypersensitiveness may appear. These remarks do not, of course, refer to those patients who have received previous massive injections—*e.g.*, for declared tetanus—or who require subsequent massive injections for therapeutic purposes. In such circumstances every precaution must be taken as indicated above.

It is obvious that nothing can be done to guard against the reaction after a first injection, as the individual gives no indication of his increased sensitiveness.

If the foregoing facts be borne in mind

and the proper steps taken to avoid anaphylactic shock, there should rarely be any call for the treatment of that condition. Should it arise, however, every effort must, of course, be made to afford immediate relief. In mild cases the attack may be over before treatment can be applied; if more severe the exhibition of certain drugs may prove of service, such as atropine, adrenalin, chloral hydrate, and pure oxygen. In using either of the first two substances, subcutaneous injection is far too slow a method; they must be given intramuscularly or intravenously. In cases of still greater severity artificial respiration may be necessary and may alone succeed in tiding the patient over the period of shock, but is better used in association with one or other of the above-mentioned drugs. In a few instances of the utmost gravity no efforts will be of avail, and death ensues.

As regards the local signs, treatment is rarely called for. Much pain and swelling find relief in a hot fomentation, while irritation is allayed by moistening the surface of the part with 1-in-60 solution of carbolic acid.

SPONTANEOUS OR NON-TRAUMATIC RUPTURE OF THE LEFT KIDNEY.

THOMAS (*The Journal-Lancet*, Feb. 1, 1917) states that a number of such cases have been reported following severe muscular strain, some having hematoma and some perinephric tumor. A few were operated on, and Herzog found sixteen cases of spontaneous and one open injury to the kidney in 7805 autopsies. Watson operated on a case of ruptured hydronephrosis, which occurred in a woman when attempting to pull down a window.

Many cases of rupture and bleeding due to chronic nephritis have been reported. Wade reports a case of rupture occurring in a luetic who also had malaria. This individual was treated with mercury, which was thought to be the cause of the acute swelling and final rupture of the kidney. At autopsy an acute nephritis with rupture of both kidneys through their fibrous capsule was found. Speese collected 21 cases and

believes the underlying cause is a chronic nephritis. He holds that spontaneous rupture is probably due to chronic nephritis.

Wade holds that spontaneous rupture may occur in acute parenchymatous nephritis due solely to the extent and rapidity of the swelling of the organ. It may occur with or without perirenal hemorrhage of sufficient degree to present symptoms.

Thomas states that he has seen many cases with symptoms of acute pain after heavy lifting, etc., sometimes followed by tumor-formation or hematuria, or both. If the patients are confined to bed without surgical interference, many of these cases clear up. He has been unable to find a proved case of spontaneous rupture in a healthy kidney. The mode of production of these lesions after slight muscular strain is not clear. A case is reported which emphasizes the following points: A rupture of a pathological kidney may occur without trauma. A functionless kidney may frequently not cause symptoms when the other kidney is sound. Formation of stones in a kidney may be symptomless. Nephrectomy seems the only treatment possible in this type of case. The patient should be closely watched, and the time of operation should be carefully selected. Spontaneous rupture of a kidney probably does not occur without antecedent pathological change.

FRACTURES OF THE EXTERNAL CON- DYLE OF THE HUMERUS IN CHILD- HOOD, WITH ROTATION OF THE CONDYLAR FRAGMENT.

STONE (*Boston Medical and Surgical Journal*, Feb. 1, 1917) observes operative interference in fractures of the elbow-joint in children is ordinarily of very little benefit. There is, however, a perfectly definite type of fracture, or rather epiphyseal separation, of the external condyle of the humerus, which practically invariably demands prompt open reposition of the fragment. The cases are those in which the epiphyseal fragment has become rotated in such a way that the slightly cup-shaped fracture surface faces outward. It can be felt just beneath the skin unless there is unusual swelling,

and can be recognized readily by the clear cut edges and the slightly depressed center. The rounded joint surface lies more or less in contact with the epiphyseal line or fracture surface of the shaft, or with the outer anterior surface of the bone just above the fracture surface. There is a space between the shaft of the humerus and the head of the radius, where the epiphyseal fragment normally belongs, which is filled with blood clot.

The periosteum is often torn off from the outer side of the shaft for a little distance upward, but may remain attached to the outer border of the rotated epiphyseal fragment. Under these conditions the torn-off periosteum may be more or less stretched across the fracture surface of the fragment. The displaced fragment may often be readily moved about, and may sometimes be pushed inward more or less into the gap from which it came, but in most instances it is impossible by manipulation to rotate the fragment back into place so that the fracture surfaces lie in contact. The fragment has rotated beyond a dead center and is locked there.

What happens if it remains in its abnormal position? New bone grows downward from the fracture surface of the lower end of the shaft toward the joint, more or less filling in the gap left by the displacement of the fragment. This callus growing downward comes in contact with the synovial surface of the rotated fragment. Thus bony union is unlikely. New bone also grows out from the fracture surface of the fragment, which, as already stated, is pointing outward and upward. The callus growing out in a sort of groping manner does not meet the shaft at all. It finds no solid bone to which it may unite the fragment. Some callus may grow from the separated periosteum at the outer side of the shaft, which may thus make a bony bridge to unite fragment and shaft, or the union between the two may remain fibrous. Under these conditions the fragment becomes a roughly rounded projecting mass, more or less firmly united to the shaft, and

mechanically obstructing the free movement of the joint.

The treatment demanded early after one of these fractures has occurred is open incision, exposure of the fragment, removal of the clot and any fibrous tissue which may occupy the space from which the fragment came, and then with a blunt dissector the prying of the fragment into place in its normal position. The procedure is simple, but the force needed to rotate the fragment back into place when everything is in sight shows how useless are prolonged attempts at reduction by manipulation.

The open reduction should be done within the first few hours, or else after a sufficient interval for the swelling and ecchymosis to have subsided.

It is possible to restore the fragment to its normal position even after an interval of two months, although such a delay is never advisable. In that time much new bone will have formed both below the fracture of the shaft and from the fracture surface of the fragment. But this new bone at first will be found to be very soft and easily wiped away with a curette. The cavity from which the fragment came and the fragment itself may be restored to their original shapes and placed in their normal relations.

After an interval of more than two months, however, it will be impossible to differentiate between the old bone and the new. Adaptive changes in the shapes of the bones will have occurred. The problem will no longer be one of restoring a displaced fragment to the place from which it came, but will be one of securing the best possible functional result under abnormal conditions. The treatment must, of course, be determined by the conditions in each case, but as a rule the excision of the enlarged and useless fragment will give better results than any plastic bone repair.

The after-treatment of the early cases is simple. No suture of any sort need be put in the bone. Usually it is impossible to stitch the periosteum. There is no tendency to displacement once the fragment is replaced. Acute flexion locks the fragment

in place. Stitches in the fascia and skin hold everything securely. These are usually inserted while the elbow is held flexed. It is much easier under these conditions to adjust the edges of the skin wound if the incision has been made L-shaped rather than curved.

Acute flexion may be maintained for a fortnight. The arm may then be put in an internal angular splint and later in a sling. Normal motion is promptly restored unless prevented by meddlesome passive motion.

THE APPLICATION OF THE MEDIAN PATELLA INCISION FOR A KNEE ARTHROTOMY.

BRACKETT (*Boston Medical and Surgical Journal*, Feb. 1, 1917) says that the median patellar route to the knee-joint is indicated in those conditions demanding an exploration of the anterior chamber of the joint, as well as for the removal of definitely loose bodies, not permanently located, for osteochondritis dissecans, and for the repair of crucial ligaments. It is an incision of considerable magnitude, but under proper precautions, and with the necessary care, it is a safe procedure, to be used when there is real reason for its use. It is not followed by a reaction proportionate to its apparent radicalism, as a rule, no more than in the usual arthrotomy. The operation is facilitated very considerably by attention to a few details of technique, and since this route is comparatively new it may be of value for those who have used it to some extent, to record their experience in regard to these details.

The incision must be long, particularly above, where it must extend to above the upper border of the lower third of the thigh, and below to beyond the tubercle of the tibia. Above the incision should slant distinctly to the outside, to follow the line of direction of the tendon of the quadriceps. The dissection of the tissues overlying the tendons need be carried laterally only far enough to disclose the edges of both the quadriceps and patella tendons. This much is necessary to insure a median division of these tendons, which otherwise is not easy.

The periosteum of the patella is cut through, but not retracted, and extended into but not through the quadriceps and patella tendons sufficiently to mark the line of incision. The patella is split by a saw cut, a little to the inside of the middle line, to leave the outside fragment a little larger than the inner, and to aid still further in this the saw cut may be slanted inward, to make the under side of the outer fragment wider than the upper. This also gives firm apposition in closing, as the tension of the tendon crowds the overhanging inner fragment down on the outer. This is not easy except with a small and fine saw, and the tendons must be first split; otherwise they will be frayed by this procedure. Ordinarily the straight cut is sufficient and often better. The saw cut is most easily begun with the knee in the extended position, and when the groove is well made, completed with the knee flexed at 45 degrees or more, in which position it is held firmly in place. The patellar tendon can be split by a single cut, but with the quadriceps it is necessary to divide it in layers, particularly in its upper part, as the fibers here are placed in a kind of spiral arrangement, the under fibers having a direction toward the inside, and the outer toward the outside, and this separation is carried on horizontally.

The alar ligaments and subpatellar fat pad are divided directly in the middle line, with the knee flexed, taking care to preserve the attachment of the ligamentum mucosum, which will usually be found on the inner half. By this median division the fat pad, with its synovial covering, can be brought together again, and leaves no raw surface exposed to the inner surface of the joint. It frequently is necessary to detach the alar ligament and the pad from the middle of the anterior surface of the tibia, to which it is only lightly attached. For a good view of the crucial ligaments it is necessary, and particularly so, to find and remove a cartilage. This is easily stitched back to the place of its old attachment and apparently does no harm. This is, however, not a good approach for cartilage, and is unnecessarily extensive.

Sterilized absorbent cotton wet in normal

salt solution is preferable for sponging, all possible friction to the synovial membrane is to be avoided. The author used silk for all parts of the closure: 6 to 8 for the synovial membrane, quadriceps pouch, and both edges of the tendon. No. 14 for the patellar suture—one on either edge, above and below, taking in the middle of the tendon, which gives a firm, strong hold; and one or two between, taking in the periosteum and expansion of the tendon of the quadriceps. It apparently is not necessary to sew through the patella to insure good apposition, for the tension of the tendon is sufficient to keep the fragments firm together. Fixation is not used, except posterior Cotton splint, which keeps the knee from full extension, and gives sufficient protection, yet allows a little motion, which is desirable. When leaving the bed, the patient wears a split plaster, which is removed during the time of being up for a month or six weeks; passive motion is allowed from the first, and given after two weeks, never to beyond the point of pain. Weight bearing in the plaster is allowed in a moderate and full normal use expected at the end of two months.

TENDON REPAIR WITHOUT ACTUAL SUTURE.

STIELL (*The Practitioner*, December, 1916) in all treated 116 cases, those involved being extensor tendons anywhere between the dorsal expansion and the insertion of the tendon into the base of the ungual phalanx. In only two, both of which were complicated by suppuration, were there any signs of either mallet-finger or an impaired extensor function.

In following the treatment for accidental division of tendon without actual suture it is essential that four important details should all be present at one and the same time; if any one of these details is absent he acknowledges that it is decidedly risky to give a really hopeful prognosis either with or without actual suture.

It is of the utmost importance that the injured finger should be maintained in position of hyperextension for at least th

weeks. This position should be brought about both at the metacarpophalangeal joint and again, if possible, at the ungual and interphalangeal joints. The method the author usually adopts to effect this position is by means of a simple flexible aluminum splint applied, for preference, to the palmar aspect of the hand and finger. In practice he finds that it is most convenient to fix the splint by means of two pieces of strapping, one of which he carries round the palm of the hand together with the splint, and the second piece round the splint and middle phalanx. By a little manipulation of the splint, before fixing it in position, it is possible in most cases to accomplish a right-angled hyperextension at the metacarpophalangeal joint with little or no discomfort to the patient. The ungual phalanx can now be slightly hyperextended by placing a pad of cotton-wool between the pulp of the finger and the splint.

It is necessary that the actual skin cut should have fairly close approximation of its edges, or, at least, the laceration must not be too extensive to render good apposition possible by means of skin stitches only. As a general rule, one finds that the position of the fingers, being in hyperextension, greatly relieves any tension on skin sutures, and, in fact, frequently abolishes this slight increase in the risk of sepsis entirely.

It is inadvisable to employ any form of drainage whatever for two reasons: first, because it tends to remove the very necessary and beneficial blood-clot from between the ends of the divided tendon; and secondly, that it only provides one more possible entrance for microorganisms. If there are early signs of suppuration when the patient first comes under treatment, or even if the wound becomes infected at a later date, then drainage becomes truly necessary. If this unfortunate complication does arise, the final functional result of the treatment will be equally disappointing, with or without actual suture of the tendon.

This is perhaps the most important factor in the treatment of "cut tendon," viz., that absolute asepsis is essential, or at least asepsis as regards the tendon sheath itself. The

author has frequently seen slight suppuration followed by a perfect functional result, but in those cases he was convinced that the sepsis was confined solely to the skin wound, and that the tendon sheath itself was uninvolved throughout.

TREATMENT OF BURNS BY AMBRINE.

At a recent meeting of the Société de Chirurgie, Professor Kirrmisson showed several patients who had been burnt very severely and had been treated by Barthe de Sanfort with quite remarkable results. Other patients, treated in the same way by Michaux, showed equally good results. These were all obtained with the use of ambrine, which was recommended by Barthe de Sanfort as long ago as 1904. He has had under his care, during the last two years, many cases of burns caused in warfare, and has found this preparation of great value. It is used chiefly for burns, but is equally suitable for other lesions, and especially for chilblains. It is a mixture of paraffin and resin, much resembling flexible collodion. It has an amber color and a resinous smell, solid consistence, and a density much the same as paraffin. It melts between 48° and 50° C., and then forms a syrupy fluid, which can be raised to a temperature of 125° C. without any alteration of its properties, so that its sterilization may be assured. It can be applied to wounds at a temperature of about 70° C. without causing the patient the least pain. It becomes solid below 45° C., and has the peculiar property of remaining for some time at a temperature of 40° C. An application will be found to be at about this temperature after being in place for twenty-four hours. It is therefore, in a way, a warm application, keeping the tissues at a raised temperature, which promotes the proliferation of the cells.

For use, a block of ambrine is broken into small pieces, which are placed in a suitable receptacle over a small fire. At 48° it melts, and the heat can then be raised gradually to 125°. The liquid is then poured into a basin and allowed to cool down to about 70°, at which temperature it is ready for

application. It can be sprayed from a spray-producer, or painted with a sterile brush over the whole surface of the wound, which has previously been washed with warm boiled water or normal saline. As the ambrine solidifies, it forms a thin skin over the surface of the wound. On this is placed a very thin layer of sterilized absorbent wool, and a further thin layer of ambrine is spread over this. The part is then covered with a few layers of gauze or wool and a bandage. It is not necessary that these should be sterilized, for the wound is quite sealed up. The dressing is simple, painless, and cheap, but a more important point is that it altogether relieves the pain in the burn. It is left in place for twenty-four hours, sometimes for forty-eight. After taking off the bandage and gauze, the whole skin is removed in one piece without causing the slightest pain, for there are no adhesions to the wound. In the case of burns, the

wound is found covered with a thick, purulent exudation, often smelling very disagreeably. This is removed by gentle sweeping off with swabs soaked in boiled water or normal saline. The surface of the wound must be quite dry before the ambrine is applied. A current of hot air is the best method, but sterile gauze answers nearly well, if applied very gently.

There are no contraindications for the use of this method. Burns of the third degree, with extensive destruction of tissue, heal up very well. The length of treatment required depends on the general condition on the extent of the lesion, and on the amount of tissue destroyed. A burn on the face of the second or third degree is usually healed in twenty-one days. An extensive burn on the arm will take nearly the same time.—*Journ. de Méd. et de Chir. pratique*, Nov. 10, 1916 (quoted by *The Practitioner*, January, 1917).

REVIEWS.

BOTANIC DRUGS: THEIR MATERIA MEDICA, PHARMACOLOGY, AND THERAPEUTICS. By Thomas S. Blair, M.D. The Therapeutic Drugs Publishing Company, Cincinnati, Ohio, 1917. Price \$2.00.

The design of this book is to emphasize the view that physicians should more largely resort to the employment of drugs which are derived from the vegetable kingdom and less to synthetic remedies, most of which have their origin in the laboratories of German chemists. There is no doubt that it has been the fashion during the last twenty years to turn to the newer synthetic products and not to pay sufficient attention to what are called amongst pharmacologists galenical preparations. This is in part due to the fact that many of the synthetics possess properties which galenical preparations do not possess, that they are put up in agreeable and convenient form, or can be so compounded, whereas in the use of fluid extracts or tinctures made from plants a certain amount of inert matter is usually included, and this inert material gives the dose an evil taste.

The intention of the author is not to

inveigh against the employment of alkaloids which represent the active principles of crude vegetable drugs, but rather to insist upon further study of the sources from which they come. He points out that failure to get good results from some vegetable drugs is due to their method of collection or preservation. Thus, in the case of cactus he asserts that if the plant is dried before pharmaceutical preparation is made from it it is inert, whereas if the pharmacist prepares his drug from the fresh plant, it possesses distinct physiologic properties. Possibly this is the explanation of the diverse opinions which have been reached by practitioners who have employed cactus.

The book contains a little less than four hundred pages and mentions, of course, many drugs which are comparatively little used by practitioners to-day. Some of them are commonly employed by so-called eclectics and homeopaths. Many of them have been dropped from the more recent editions of the Pharmacopœia, and some of them have been dropped from the National

Formulary.

The author well points out that pharmacology tells us the probabilities regarding a drug and what its line of possible utility may be, in distinction from the clinical investigations, which may not be surrounded by as many scientific boundaries or limitations, but which, nevertheless, provide most of the indications that we follow in the administration of medicine. As a book designed to call renewed attention to the drugs which are derived from the vegetable kingdom, this one is timely and will perform a useful function.

CANCER: ITS CAUSE AND TREATMENT. By L. Duncan Bulkley, A.M., M.D. Paul B. Hoebner, New York, 1917. Price \$1.50.

The readers of the *GAZETTE* will recall the fact that two years ago Dr. Bulkley put forth a small book in which cancer was considered from quite a different angle from that commonly held by the profession and laity. He also on more than one occasion has made contributions to the pages of the *GAZETTE*.

The present volume is composed of a series of lectures arranged in the form of six chapters. It concludes with a summary which the author has entitled "The Real Cancer Problem." He considers the mortality from cancer and the influence of sex, age, occupation, etc., upon its occurrence; but the chief burden of his theme is with the influence of food upon this disease and with the conditions of the blood. For this reason he devotes the fifth chapter to the dietetic and medical treatment of cancer prophylaxis, and in his sixth chapter gives the results which he has obtained in carrying out his ideas.

It will be recalled that the underlying basis of Dr. Bulkley's position may be described in his own words to the effect that the real cancer problem relates to placing the patient in such a normal or ideal state of life that the function of nutrition is performed in exactly the proper manner. He regards animal proteins as a fertile cause of the derangement of metabolism which leads up to and forces the growth of cancer, and believes that it has somewhat the same rela-

tion to cancer as heavy wines have to gout. For this reason he is an advocate of an absolute vegetable diet as a means of combating the development of cancer.

His advice in regard to the directions to be given to patients who have developed cancer is excellent, but his statement that it is not always necessary to operate for cancer, that the *x*-rays and radium are often of value, and that the disease can also disappear and remain absent under careful and efficient dietetic and medical treatment is very questionable advice, if handed to a layman. The exact value of the *x*-rays and radium is to be determined. While they prove very valuable in certain superficial epitheliomata, they generally fail in deep-seated growths. So, too, we do not think that the profession is yet ready to embrace the thought that the dietetic treatment of cancer consists in an absolutely vegetable diet. Those who doubt the position taken by Dr. Bulkley in regard to this important matter should, however, recall the fact that he has had a very large and long experience with cancerous growths, and that his enthusiasm in the study of these grave conditions has led him to devote an amount of time and energy to their investigation which deserves much credit.

PULMONARY TUBERCULOSIS. A Handbook for Students. By Edward O. Otis, M.D. W. M. Leonard, Boston, 1917. Price \$1.75.

Dr. Otis, who is Professor of Pulmonary Diseases and Climatology in the Tufts College Medical School, Boston, has written a manual of two hundred and twenty pages with sixteen full-page illustrations to present the views which he holds as a result of having studied pulmonary tuberculosis for many years. Each chapter begins with a verse or sentence, from some poet or writer, which is believed by the author of the book to be appropriate. Altogether there are fourteen chapters.

After a discussion of the anatomy and physiology of the respiratory passages, the history of tuberculosis, the pathology and bacteriology of the disease, Dr. Otis devotes two chapters to diagnosis, one to

prognosis, and one to treatment. Of course, he emphasizes the value of outdoor treatment and sanatorium treatment, the usefulness of proper feeding, the limitations which should be put upon exercise, proper clothing, and the administration of various agents of remedial nature. He speaks cautiously of the value of tuberculin and recognizes its limitation. So, too, he is cautious in regard to the general recommendation of the production of pneumothorax. For the relief of cough he thinks well of heroin and dionin. Nitroglycerin is recognized as a useful remedy in hemoptysis, but nothing is said of the fact that chloroform can also be used if nitroglycerin or amyl nitrite is not at hand.

The closing chapters of the book deal with tuberculosis in children, the use of climate in the treatment of tuberculosis, prophylaxis, marriage, and reports of cases which the author considers interesting or valuable. In the chapter on Tuberculosis in Children, practically nothing is said of the very interesting question as to whether the primary infection takes place through the respiratory or alimentary tract, but the fact is recognized that many cases of tuberculosis which develop in later life are the result of an infection which took place during childhood.

INTERNAL SECRETIONS: THEIR PHYSIOLOGY AND APPLICATION TO PATHOLOGY. By E. Gley, M.D. Translated from the French by Maurice Fishberg, M.D. Paul B. Hoeber, New York, 1917. Price \$2.00.

There are few subjects of greater interest to medical men in every branch of their profession than that of the endocrine glands, and Professor Gley has prepared the text of this volume in order to bring together in readable form an immense amount of literature which can be put to more or less practical use. The translator, who is already well known for his work in connection with tuberculosis, has not endeavored to make a literal translation, but has borne in mind the need of expressing the real meaning of the author.

There are five chapters in the volume, which begins with an introduction describ-

ing the differences between the two kinds of secretions, next a brief historical summary of the subject, and, after this, distinctive characteristics of the internal secretory glands and the principal products of their activities. After this there is a classification of the internal secretory glands and the products which they secrete, and, lastly, a description of the functions of these glands with a consideration of reciprocal actions between them, a subject which is rapidly being understood as of great importance. The book closes with a consideration of the diseased functions of these glands, including hypersecretion, hyposecretion, and trophic deviations. A very considerable amount of literature is referred to under copious foot-notes. As the book contains less than 250 pages of large type, well spaced, it is one which can be read gone over in a comparatively brief space of time, and, it goes without saying, provides a large amount of interesting physiological and clinical matter.

CASE HISTORIES IN OBSTETRICS. By Robert L. Normandie, A.B., M.D. Second Edition. M. Leonard, Boston, 1917. Price \$4.00.

The first edition of this book appeared in 1914, and at that time received our favorable recommendation. The method of reporting of cases which are supposed to be typical, and the author states that the histories are all records from actual patients. By means of these illustrative cases the author has successfully attempted to represent the various conditions which are met with in obstetric practice, dividing his text into twenty-eight sections, the first dealing with Diagnosis of Pregnancy and the last with The Management of the Baby. Most of the minor and serious complications of pregnancy and labor are therefore included. A section is devoted to "The Morphine and Scopolamine Method." The author states that the furor which passed over this country a year or two ago in regard to "twilight sleep" has to a certain extent died down, but that some patients still demand it. He thinks that the risk of an untrained man using "twilight sleep" is greater than that

risk of this man doing a moderately good forceps delivery. He points out the difficulty in obtaining a good preparation of scopolamine, and says that in his experience the motor excitement is sometimes tremendous, necessitating several nurses to hold the patient in restraint, and that no one can foretell which patient will manifest these symptoms. Finally he states that in his opinion "twilight sleep" has a small place in obstetrics, and that for the general run of cases he is confident that other means of analgesia are much more satisfactory. These views seem to be in accord with the majority of obstetricians at the present time.

Concerning eclampsia, the author points out that many writers have advised delivery in eclamptic patients by Cæsarian section. His belief is that this is permissible in a few well-picked cases, when it should be recognized that any operative procedure carries added risk to the patient already dangerously ill. For postpartum eclampsia he recommends free bleeding. In one case 25 ounces were withdrawn with a fall in blood-pressure from 165 to 110. He also advocates, combined with eliminative treatment, the giving of morphine hypodermically in sufficient amounts to bring the respiration to at least ten per minute. The diet should be limited to milk, and, in his opinion, "eclamptic babies" should be given a teaspoonful of castor oil shortly after birth to aid them in eliminating poisons. He does not believe that the infant should be allowed to nurse the eclamptic mother.

THE STARVATION TREATMENT OF DIABETES, WITH A SERIES OF GRADUATED DIETS. By Lewis Webb Hill, M.D., and Rena S. Eckman. Third Edition. W. M. Leonard, Boston, 1917.

We learn from the publisher's note which accompanies this book that the present third edition represents the twentieth thousand. There has been a general revision and increase of sixteen pages. The diet lists have been rewritten, as have also the recipes, which are increased in number.

It will be recalled that the object of this little book, when it first appeared in 1915,

was to provide a working manual for practicing physicians who wished to institute the so-called Allen method of treating diabetes, a method which undoubtedly gives excellent results in a large number of cases, and which is markedly opposed to some of the views which were generally held as to the danger of starvation in diabetes before Allen's original publication appeared. Those who wish an exhaustive discussion of this subject will doubtless desire to purchase Joslin's book, which is much larger and more complete, but for the ordinary hurried practitioner this little volume of less than 150 pages has already proved, and will continue to prove, a very handy manual.

An innovation in the present edition is the addition of a table containing the analyses of various proprietary and other food preparations made by the Connecticut Agricultural Experiment Station, and which the publisher states are authoritative and will be useful in guiding practitioners who may be called upon to advise patients as to the actual value of many commercial products, some of which contain so large a percentage of starch as not to lend themselves to the starvation treatment of this disease as illustrated by the text of the book.

REST, SUGGESTION, AND OTHER THERAPEUTIC MEASURES IN NERVOUS AND MENTAL DISEASES. By Francis X. Dercum, A.M., M.D., Ph.D. Second Edition. P. Blakiston's Son & Co., Philadelphia, 1917. Price \$3.50.

This volume is only in one sense a second edition, since the text was first prepared as an article upon these subjects in the *System of Physiological Therapeutics* edited by Dr. S. Solis Cohen some years ago, it forming Volume VIII of that System. Opportunity has been taken to carefully revise and rewrite some of the chapters and to bring the text up to date. As would be supposed from its title, much importance is attached to rest, proper feeding, and psychotherapy. Careful attention is given to the difficult subject of the interpretation of neuroses and the importance of distinguishing between simple neurasthenia or fatigue neurosis and psychasthenia, with lines of differ-

entiation between these conditions and hysteria and hypochondria. The third part of the volume deals with suggestive therapeutics, and details are given in regard to this matter, pointing out the value of suggestion, direct and indirect, and the conditions in which it proves most useful.

The last part of the book deals with suggestions by mystic and religious methods, hypnotism, etc., and is largely historical in its dealing with pythionism, magnetism, mesmerism, hypnotism, Perkin's tractors, faith cure, and Eddyism. Points of importance are emphasized by printing them in heavy type. Careful advice is given in regard to the treatment of young persons who come of a neurotic ancestry, or who, still more unfortunately, may be thought to inherit mental instability. One of the important characteristics of the book is the very conservative and sane attitude of the author toward questions concerning which certain persons within recent years have seemed to run wild. The general practitioner is sometimes tempted to think that a certain class of neurologists are almost as far off the track as many of the patients who consult them. Several years ago we heard a well-known physician ask to be shown a normal neurologist; if any physician is still searching for such a *rara avis* he will find him in the author of this book.

TEXT-BOOK OF OPHTHALMOLOGY. By Hofrat Ernst Fuchs. Translation from the twelfth German edition. Completely revised and reset, with numerous additions specially supplied by the author and otherwise much enlarged, by Alexander Duane, M.D., Surgeon Emeritus, Knapp Memorial Hospital, New York. With four hundred and sixty-two illustrations. Fifth Edition. J. B. Lippincott Company, Philadelphia. Price \$7.

Fuchs's Text-book of Ophthalmology for many years has been the standard work in this department of medicine and surgery, and it was a happy circumstance when nine years ago the first English edition, translated and edited by Dr. Duane, came into the possession of ophthalmologists in English-speaking countries. The present or fifth edition is indeed a new work, for no new German edition has been issued, and

the translator and editor has with his own hand, wise judgment, and characteristic excellence supplied the necessary additions and made the needed alterations. In fact, this fifth English edition is far superior to any of the German editions, and contains so much of value from the pen of Dr. Duane that his name might well appear prominently as an editor and translator, but he is merely as an editor and translator, but a joint author in the book. He graciously acknowledges Fuchs's liberality in granting permission for the additions which he has made, and also for the notes which he himself has supplied for many of these additions. The most important new material contained in the chapters on glaucoma, diseases of the retina, disturbances of accommodation, and in the sections devoted to refraction, accommodation, and the description of operations.

The reviewer has nothing but praise for this book, which for more than a quarter of a century has commended itself to ophthalmologists all over the world, reflecting the vast experience of Hofrat Fuchs in clinical observation and pathological work, and reflecting, too, in the American edition, the knowledge and experience of Dr. Duane, his many original observations, and his scholarly attainments.

G. E. D.

DISEASES OF THE STOMACH, INTESTINES AND PANCREAS. By Robert Coleman Kemp, M.D. Edition, Revised. Copiously Illustrated. Saunders Company, Philadelphia, 1917. \$7.00.

Dr. Kemp's book now covers ten hundred and ninety-six pages and contains one hundred and thirty-eight illustrations. The first edition appeared in 1910. In the present edition the great value of the book as an aid to diagnosis of the gastrointestinal tract has received much attention. Many of the radiographs are from the author's cases. There is a chapter upon Ladd's operation, Jackson's membrane, duodenal diverticulum, and the relaxed ileocecal valve.

We are interested to note that the author's attitude in regard to Lane's investigations and operations is distinctly conservative. The readers of the GAZETTE

will recall that we have already in our editorial columns pointed out that such measures are justifiable only under very rare conditions, and with this opinion we are glad to note that the author is in accord. Dr. Kemp also attempts to correct erroneous ideas concerning autointoxication by dealing with intestinal putrefaction and by inserting a section on subinfection and protein absorption. Much care is taken to indicate medical measures and treatment as well as methods of diagnostic investigation. The author does well to insist upon the view that gastrointestinal neuroses are extremely rare, and that in a large majority of instances such conditions will be ultimately found to depend in reality upon organic lesions which have failed to be properly investigated or discovered.

DISEASES OF THE GENITO-URINARY ORGANS AND THE KIDNEYS. By Robert Holmes Greene, A.M., M.D., and Harlow Brooks, M.D. Fourth Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia, 1917. Price \$5.50.

This is a composite book written by a surgeon and a medical clinician. During the last seven years it has passed into four editions, and it is manifest, therefore, that it has been useful to those who have been fortunate enough to purchase it. The aim of the authors has been to devote equal attention to the medical and surgical aspects of the diseases discussed. There are thirty chapters which deal with the methods of examination, both surgical and medical, in diseases of the genito-urinary tract and the therapeutic procedures which should be resorted to, whether they be medical or surgical. It is evident, therefore, that the authors have had a large field to cover, and they have done this successfully. The book is well illustrated, with a complete index. The spacing between the lines is wide, the type clear, and while the paper is unnecessarily heavy, all these facts tend to make the volume easy for reading. The illustrations, too, are practically useful and aid materially in indicating to the reader how various methods of procedure should be resorted to. Both of the authors are well and favorably known for their activities in

these two branches of clinical work, and the book is a credit to them and the medical profession in this country.

A COMPEND OF HUMAN PHYSIOLOGY. Especially Adapted for the Use of Medical Students. By Albert P. Brubaker, A.M., M.D. P. Blakiston's Son & Co., Philadelphia, 1917. Price \$1.25.

More than thirty years ago, if we remember correctly, the first edition of Dr. Brubaker's Quiz-Compend upon Physiology made its appearance. By careful revision and editing he has kept it within approximately the same bounds as it originally possessed. Always popular with students, there is every reason to believe that in its present form its popularity will be maintained. As with all books of this character, it is not intended by the author to be used to the exclusion of the larger manuals, notably the Text-book on Physiology by Dr. Brubaker, but rather as a goad with which the student may brush up and find out the subjects which he should study in larger manuals in order to have competent knowledge of this important matter, a study which medical students are all too prone to ignore during their student days, but which they appreciate the importance of with every year that goes by in after practical life, for the medical man who does not know, and have at his finger-tips, the fundamental principles of physiology cannot hope to understand the processes of disease or the effects of drugs upon both normal and abnormal organs.

STATE BOARD QUESTIONS AND ANSWERS. By R. Max Goepf, M.D. Fourth Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia, 1917. Price \$4.25.

The fact that every physician who wishes to begin practice has got to go before some State Board of Medical Examiners, and nearly always feels the need of some helpful preparation for such an examination, produces a definite need for a volume of this character. The first edition appeared in 1908, and it and the other editions have been reprinted a number of times. In the present edition, which covers no less than

seven hundred and twenty-four pages, and which is illustrated when necessary, an immense number of questions and answers in all the departments of medicine which State Boards cover are given and competent answers appended. New laboratory tests which are now commonly employed as to disease of the kidney and disturbances of metabolism have been introduced, as have also serological tests and various functional tests. A number of questions which heretofore have not been given but which seem to have become popular with State Board Examiners are also introduced.

The amount of work expended by the author in the preparation of this volume must have been very great, and his ability to put in brief and compact form all the information which is desired is to be highly commended. Many physicians who are not going before the State Boards will find in these pages an immense amount of information which will be useful to them as practitioners as well as laboratory workers.

DISEASES OF CHILDREN. A Manual for Students and Practitioners. By George M. Tuttle, M.D., and Phelps G. Hurford, M.D. Third Edition, Thoroughly Revised and Enlarged. Illustrated. Lea & Febiger, Philadelphia, 1917.

The first two editions of this book were prepared by Dr. Tuttle, and in the preparation of the third edition he has called to his assistance Dr. Hurford. Dr. Tuttle tells us in the Preface that the greater burden of the revision has fallen upon the latter. The book is not one of the large exhaustive monographs upon pediatrics, covering a little less than six hundred pages. It is emphatically a practitioners' manual without bibliographic references, and written in much the same style as a teacher would prepare text for an individual student or fellow practitioner. In one sense it may be called a book on the practice of medicine limited to children below the period of adolescence. There are nineteen chapters in the book which deal with the development of the child, feeding, and the diseases of various organs, as well as infectious diseases, and diseases of obscure origin.

DISEASES OF THE STOMACH. A Text-book for Practitioners and Students. By Max Einhorn, M.D. Sixth Revised and Enlarged Edition. William Wood & Company, Philadelphia, 1917. Price \$4.00.

Dr. Einhorn has been known to American medical men for many years as an earnest pioneer student of diseases of the digestive apparatus. The fact that his book, dealing with such a special subject, has reached its sixth edition within a comparatively short time emphasizes its value. He not only gives his own views and methods, but all the important articles are accompanied by bibliographic references which show that in preparing the text he has carefully gone over the literature and so is familiar with the work done by other clinicians and investigators in this country and in Europe. When necessity arises he illustrates a meaning by describing patients that he has personally seen and examined. The book is printed in such large type and such wide spacing that it covers nearly six hundred pages, but this adds materially to the ease with which it can be read. It is freely illustrated, and the sixth edition is, like most later editions, a distinct improvement on earlier ones.

EYE, EAR, NOSE, AND THROAT. A Manual for Students and Practitioners. By Howard Chamberlain Ballenger, M.D., and A. G. Wippern, M.D. New Second Edition, Thoroughly Revised and Freely Illustrated. Lea & Febiger, Philadelphia, 1917. Price \$3.50.

In the compiling of the text of this volume, which covers about five hundred pages, Dr. Ballenger considers Diseases of the Nose, Throat, and Ear, and Dr. Wippern is responsible for the section upon the Eye and its Affections. The book is designed as an exhaustive treatise upon these subjects; on the contrary, it is much more in its scope a résumé or compend than an exhaustive book. No literature is quoted but commonly accepted facts on the part of specialists in diseases of the organs named in its title are expressed. Methods of operation are shown by illustrations which are excellent, but the question naturally arises as to whether it is proper for the general practitioner to undertake radical operations upon the frontal sinus and the

ethmoid region without special training over a long period of time. Certain it is that operations on these parts are not devoid of danger even when they are performed by well-trained and conservative operators. The text of this volume, while clear and definite, so far as operations are concerned, is therefore better suited to inform the student and physician what should be done by those who are trained and skilful than it is to lead him to the belief that he is competent to resort to such surgical interference, a very proper qualification.

PRINCIPLES OF PHARMACY. By Henry V. Arny. Ph.G., Ph.D., F.C.S. Second Edition, Revised. W. B. Saunders Company, Philadelphia, 1917. Price \$5.50.

When Dr. Arny's first edition appeared we pointed out its many advantages. This first edition appeared eight years ago, and a considerable amount of new material has been gotten together and introduced into the pages of the present edition—the more so as, since the appearance of the first edition, the new Pharmacopœia has gone into effect and the fourth edition of the National Formulary has appeared. Although the author has used every endeavor to keep the book within bounds, it now covers more than a thousand pages. It is designed, of course, chiefly for the pharmacist and undergraduate medical student who is taking a course in pharmacy. To those physicians who still prepare and dispense their own drugs it can be cordially commended.

AN INDEX OF DIFFERENTIAL DIAGNOSIS OF MAIN SYMPTOMS. By Various Writers. Edited by Herbert French, M.A., M.D., Oxon., F.R.C.P. London. Illustrated in Black and White and in Colors. William Wood & Company, New York, 1917. Price \$10.00.

This book is a single volume system of diagnosis, the companion volume to another one issued in 1907 and entitled "Index of Treatment." Twenty-three well-known English physicians contribute to its pages, the largest number of articles, however, being contributed by the editor, Dr. French, whose communications cover almost every department of medicine. Some of the

authors, on the other hand, contribute only one or two articles, as, for example, Cambridge, on Pancreatic Reaction; Coombs, on Irregular Pulse; Fletcher, on Headache and Vomiting; Gilford, on Dwarfism. The illustrations are remarkably good. This holds true especially in connection with the colored illustrations, which in other books often are remarkably bad. The book contains an immense amount of valuable information, as it is closely leaded, the pages wide, and the type is not overly large, but, nevertheless, quite large enough to make its reading easy. No attempt is made to arrange the text according to symptomatology. The articles appear, as they would in an encyclopedia, in alphabetical order. Practically every one of the contributors is a man who has already made his mark in medicine, and, therefore, what is said is written of authority. The volume is a notable contribution to modern medicine and will doubtless prove interesting and of great value to the active practitioner who consults its pages.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Obstetrics, Edited by J. B. De Lee, A.M., M.D. With the Collaboration of H. M. Stowe, M.D. The Yearbook Publishers. Series 1916. Chicago. Price \$1.35.

This individual one, of an always welcome series, representing as it does a summation of current literature, takes up Pregnancy, Labor, the Puerperium, the New-born, and Obstetrics in general. Under these headings will be found excerpts and reviews of the most valuable papers of last year upon such subjects as Physiology, Toxemia, Eclampsia, Abortion, Painless Labor, Twilight Sleep, Placenta Prævia, Puerperal Sepsis, the Diseases and Accidents affecting the New-born, and Infection; moreover, such interesting topics as, for instance, shall more than one finger be employed in vaginal examination? At times these books are compiled without a large sense of proportion or a clear concept of what the profession really wants. Such a criticism cannot hold in regard to the present volume.

NOTES AND QUERIES.

DELIVERY THROUGH SHELL WOUND.

The *British Medical Journal* of February 17, 1917, abstracts an article by Saint, Goelinger, and Poiré (*Journ. de Méd. et de Chir. Prat.*, Jan. 10, 1917) in which they record the case of a woman six months pregnant in whom delivery was brought about by a remarkable accident. She lived in a region occupied by the British and constantly bombarded, and was sitting at a window when a shell exploded in the street and wounded her in the lower abdomen. When brought to the hospital it was found that the belly was very painful and palpation was so difficult that it was impossible to determine the position of the fetus. An aperture of entry was found a little below and to the left of the umbilicus, and that of exit at a distance of nine centimeters from the left crural arch. On palpation it was found that the abdominal muscles were completely divided and that only a bridge of skin was left between the two apertures. The patient was bleeding abundantly through the vagina. The bridge of skin was cut through and laparotomy was performed. On the fundus there was found a wound of about five centimeters through which was seen the lumbar region of the fetus showing a small wound. The wound was enlarged, when the fetus was easily delivered; the pelvis, which was full of meconium and amniotic fluid, was cleaned, and the operation was completed by careful hemostasis and suture of the uterus. The case ran a normal course and the mother made a rapid recovery. As for the child, which was left unattended to as it was believed to be dead, it soon began to cry and to show itself very much alive. It weighed 950 grammes; but as no incubator was available it died in fifteen hours. The authors believe this is the first case of the kind in the present war.

[We may recall, however, that in the *British Medical Journal* of December 4, 1915, it was stated that Dr. Henrot had not long before given to the Paris Académie de Médecine an account of the bombardment of the hospital at Rheims. The maternity

patients were by way of precaution moved to the cellars. One of the women delivered by the action of a shell, wound tore open the abdomen and uterus; the child had simply to be extracted. This, of course, be the same case as the one reported by Saint, Goelinger, and Poiré, as Henrot speaks of a "fine child" having been presented to him, while in the hospital the child was premature and died in a few hours, it seems more probable that there have been two war accidents of the same kind.

CORRESPONDENCE.

APOMORPHINE AS AN ANTIDOTE TO STRYCHNINE.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: I would be pleased to know if there is any literature on strychnine poisoning treated with apomorphine? I do not remember ever seeing anything in print. Recently I had a case that took nearly a week to treat. The patient had taken about a grain by mouth. I saw him in about an hour afterward and he was having severe convulsions. Before I arrived he had given him at least one quart of sweet milk. I administered apomorphine gr. one-tenth, expecting to empty his stomach but did not, and repeated the dose in ten minutes. It made him slightly sick and he tried to vomit, but could not as the spasms would come on in the attempt. After the second dose I soon noticed abatement of the spasms, and in one and one-half hours the convulsions had disappeared entirely. The patient was administered the same amount to a large dog the day before, and the dog died about an hour or so.

I have made inquiry of Dr. Robertso, a veterinary surgeon, and he states that he has treated twelve cases of strychnine poisoning with apomorphine. All of them were cured, having marked convulsions, but he has lost two cases out of the twelve. He states that they usually vomit, and the convulsions cease in a short time afterward. He states that a large dose is required, about one-fifth grain. In my case I was only able to produce very slight emesis. I would like to know if apomorphine is a physiological antidote.

GEORGETOWN, OHIO.

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ORIGINAL COMMUNICATIONS.

A CLINICAL CONSIDERATION OF THE ETIOLOGICAL IMPORTANCE OF FAT IN THE ALIMENTARY DISTURBANCES OF THE ARTIFICIALLY FED AND OF THE THERAPEUTIC VALUE OF FAT-FREE FOODS, NOTABLY SKIM MILK.

BY HARRY LOWENBURG, A.M., M.D., PHILADELPHIA.

Pediatrist to the Mt. Sinai Hospital and to the Jewish Hospital of Philadelphia.

In looking over the records of feeding cases which have been under my private care, I was impressed by the large number of infants which I have placed upon fat-free or theoretically fat-free foods, or foods which were admittedly administered primarily on account of their low fat content. Of the first, skim milk was the most frequently prescribed. Of the second, butter-milk or protein milk or some one of its substitutes was employed. It is of some importance to note that nearly all of these cases were referred to me for treatment by fellow practitioners, or came under my care as the result of unsuccessful feeding, either lay or professional. Although differing somewhat in the detail of application in the individual infant, it was found that the cases included in this résumé all yielded to a method of treatment apparently uniform in its fundamental idea, viz., a reduction in fat. The logical conclusion to be drawn from this experience is that the identical etiological factor underlying all of these cases is excessive fat feeding (relative, meaning excessive for the individual and not estimated by actual percentage composition or caloric yield), and that the inexperienced feeder commonly falls into the error of ordering too much fat.

It will be noted that the expression "inexperienced feeder" is employed instead of "unscientific feeder." The latter is to be avoided inasmuch as its opposite, "scien-

tific feeder," conjures in the mind of the practitioner an algebraic and mathematical expert whose preoccupation consists in feeding to infants impossible percentages and calories to the exclusion of ounces of milk and water, and whose conscious moments are devoted to high-brow and cynical criticism of his eminently successful but equally so-called "unscientific" but "experienced" brother practitioner. Unfortunately much of the so-called "scientific feeding" has been proven to be "unscientific" in principle and in application, and has been only so proven by experience. In this connection I wish here again to emphasize what I have stated and written many times before, that the key-note of successful infant feeding is individualization coupled with the ability to correctly interpret the appearance of stools and to apply this knowledge properly to the particular baby under consideration.

The ability and willingness to do this distinguish the scientific and experienced feeder from the unscientific and inexperienced one. The latter refers to the physician who does not study his cases clearly, who feeds by rule of thumb or by this one's or that one's method, who prescribes food in a manner in which he would not dare to administer drugs with equal carelessness, who oversteps all bounds of latitude for which admittedly the forces of nature provide, who then marvels at his

failures and in turn derides and blames those who combine common sense and brains in their relation to the problems of infantile digestion and nutrition.

The purpose of this paper, therefore, is not to offer a new precept in infant feeding, nor to elucidate a hitherto unknown fact, but to direct the attention of the general practitioner to an error that he is daily committing, and to remind him that he is able and competent to treat nearly all of his feeding cases himself if he will but study them with the same interest and enthusiasm with which he studies his cases of internal medicine. My topic is not for specialists, unless they are of those who still blindly will not see. My experience teaches me that, though this error has been pointed out years ago and many times since, it still requires emphasis and renewed attention.

Almost from the beginning of his career the eminent Jacobi has been teaching the dangers of excessive fat feeding, and for this reason opposed the introduction of the top-milk methods of milk modification, or, better stated, adaptation. In 1906, before the American Pediatric Society, Holt read a paper entitled "Some Phases of the Feeding Problem," in which he emphasized that it was unsafe to exceed 4 per cent of fat in any formula of cow's milk, and that for safety's sake it was best to feed much below this. A galaxy of pediatric authorities—Jacobi, Rotch, Morse, Abt, Cotton, Griffith, and others—discussed this paper. There was practically a unanimity of opinion amongst them all that digestive disturbances may frequently be laid at the door of excessive fat feeding and that it was rarely safe to exceed 4 per cent of fat. There was but one dissenting voice. It is important, however, to again stress the fact that the term "excessive" refers to the individual and is relative and not absolute. What is excessive for one may not be for another, and this is true not only of fats but for all the ingredients of the food, and in fact it is true of all types of food themselves.

More recently the investigations of Czerny (Berlin) have ascribed to excessive fat feeding an important place in the etiology of abnormal nutritional states of infancy and childhood. These have particular reference to the diarrheas of infancy and to pathologic states, representing frequently a symbiosis, as it were, of exudative and of infectious phenomena. While it is true that Czerny's views are opposed by those of Finkelstein in so far as they relate to the alimentary disturbances of infancy, and while the clinical application of many of his theories is not always followed by the results anticipated and desired, nevertheless his references are extremely valuable and enlightening.

Of more pregnant interest, perhaps, in so far as they have a direct bearing upon the clinical features of many of these cases, as will be indicated later, are the studies of Steinitz, Rothberg and Birk, which disclose the fact that the salts of the feces may be increased by increasing the fat in the food. (Quoted by Morse and Talbot in *Diseases of Nutrition and Infant Feeding*, page 54; MacMillan, 1915.)

I wish now to define the type of cases to which I have made reference. I am sure that the average physician will experience no difficulty in recognizing it. I shall address myself to the artificially reared, although the condition does, with considerable rarity however, occur in the breast-fed as well. For some one of the many reasons usually offered, a baby is removed from the breast. For a while it does well and gains regularly. Soon, however, the mother, as most mothers do, will complain that the infant is constipated. It may or may not be. She has exhausted the effects of local irritants (enemas, suppositories, etc.) and the commoner drugs, and she appeals to her medical adviser for assistance. It is here that the practitioner usually falls into the error which will presently be indicated, and which is responsible for the continued downward course of the baby. The constipation must be investigated and its full value established in the nosology of the

case. It is either real or it is not. If it be real, it is due to one of two primary factors: either to a digestive disturbance wherein the elements of the milk mixture are not suitably balanced to meet the digestive functions of the individual, or the sphincteric reflex has not yet become attuned to react automatically to the fecal mass as the latter reaches the lower rectum. This second condition is very common and sooner or later yields to educative efforts and to mild local assistance. The former is more common in the bottle-fed, and herein is taxed the physician's skill in determining the true condition by the physical appearance of the stool. If this be hard, inspissated, and dry, or if it be pasty and greasy, the cause will be found to be in the food. If the condition has persisted for some time, it will be noted that the nutritional balance has steadily though quietly suffered. The weight has remained stationary for weeks, or there is recorded an actual although slight loss. The child is fretful and appears hungry. The general appearance of the baby is suggestive. It is pale. Its flesh has lost tone and it appears flabby, especially about the inner aspect of the thighs. The skin appears transparent. Head sweating is induced by the mildest exercise and sometimes occurs spontaneously, as during sleep. The urine presents a decidedly ammoniacal odor. There may be slight beading of the ribs. In a word, as the case progresses, the signs of incipient rickets appear. A suitable adjustment of the food will correct these cases, the time of cure depending upon the time that the condition has persisted, although in many instances surprisingly quick results are obtained. Unfortunately, the physician rarely makes the suitable dietary adjustment, but falls into the error just referred to, viz., of attempting to treat the constipation by drugs or by increasing the amount of fat in the formula by the addition of cream or of top milk, or by employing both drugs and cream. Both methods are faulty. In the first instance he merely recognizes the constipation as a condition *per se*, to be

relieved by the easiest method at hand. In the second instance he acknowledges the constipation as a part of a nutritional state, but is at a loss to know how to correct it dietetically, and, as just stated, attempts to overcome it by the addition of more fat. This is done also with the hope that the infant will gain. He has not recognized the fact that the excess of fat is the underlying cause of the constipation and of the failing nutritional state, and probably, although of course not necessarily, the only cause. The constipation is unbenefited. More commonly an acute alimentary disturbance is inaugurated with more or less rapidity. Diarrhea ensues. Vomiting, increased irritability, and slight temperature occur, and, as a result of these, marked depression of the weight curve becomes manifest. The stools are from five to ten per diem. They contain more or less mucous, soft, white particles, are acid in reaction, and are yellowish-green or green in color. If placed in water, fat droplets will float upon the surface. The stained specimen will indicate neutral fats and fatty acids. Many of the white particles, regarded as casein curds, will test out as soaps or fatty acids. The vomitus is rancid and smells like stale butter (butyric acid). Recognizing a pathologic state, the physician now withdraws all food, administers castor oil, and the acute condition subsides. He again inaugurates milk feeding, but usually repeats his former mistakes. Not having recognized the causal factor, the tolerance of the alimentary forces is again exceeded by a too rapid increase in the strength of the food, especially in the fat, and a renewed attack of acute alimentary disturbance ensues. The weight suffers again. The resistance becomes a little less; the infant is one step nearer complete nutritional bankruptcy — marasmus so-called, or the decomposition of Finkelstein! Usually, however, before this occurs, the child is referred to the feeding specialist or drifts into his hands.

Having had his attention drawn to this type of case, the experienced physician will

find little or no difficulty in recognizing it as being common, and will readily acknowledge the part he has played in its production, his lapse being his failure to recognize an excess of fat as the causal agent. In this connection it may be well to state that the quantity of fat may be increased beyond the point of tolerance not only by raising the amount of cream in the mixture but also by reducing the quantity of milk or diluent, or by feeding or forcing an excessive quantity of a formula whose strength is suitable to the particular baby for whom it has been prescribed.

With reference to the mechanism of production of this type of alimentary disturbance, it will be of some interest to refer briefly to the physiology of fat digestion, absorption, and metabolism. The fats of milk are neutral fats—i.e., they represent a combination of a fatty acid with glycerin. In cow's milk the combination exists less firmly than in human milk, and the fatty acids are of the lower or more volatile type and are more irritating in their effects upon the gastric and intestinal mucosæ. This explains Wentworth's conclusion that the fat of human milk is tolerated much better than that of cow's milk (*Boston Medical and Surgical Journal*, 1910, and *Archives of Internal Medicine*, 1910). Neutral fats cannot be absorbed; they must first be split into soaps and glycerin. This is accomplished by the alkalies and ferments of the bile and pancreatic juice. If the alkali is present in sufficient amount to neutralize all of the fatty acids liberated, other things being equal, a normal stool is formed. If there be an excess of fatty acids but a sufficient amount of alkali to neutralize them, hard, dry, constipated, mucus-free, alkaline stools are formed. Thus we can account for the fact that an excess of fat may readily induce constipation, but it does it at the expense of the mineral metabolism, as we shall presently see. This is confirmed by the researches of Steinitz, Rothberg, and Birk, to which reference has already been made. If in addition to the sufficiency of alkali to neutralize whatever

fatty acids may exist, there be incorporated in the stool more or less unchanged neutral fat, there results the greasy, bad-smelling, constipated stool met in this condition. We may now also understand why these babies do not gain in weight, as the unchanged as well as the emulsified and saponified fats are not all absorbed and are passed out *per primam viam*. If sufficient alkali be derived from the normal glandular secretions, the mineral metabolism does not suffer. If, on the other hand, a drain be made upon the salt reserve, as a result of a great excess of fatty acids, especially upon the calcium, in order to accomplish the saponification and neutralization, demineralization of the body will occur and the evidence of rickets and anemia will become manifest. Constipation will continue, however, as long as the amount of the free fatty acids does not exceed a certain point. Should this occur, as it commonly does, diarrhea results and demineralization as well as dehydration of the infant's organism progresses with alarming rapidity. An increase in the amount of fat in the food is usually responsible for the excess of fatty acids. There is not sufficient alkali to neutralize or to saponify all of the fatty acids set free, and these act as irritants to the intestinal mucous membrane and are directly responsible for the diarrhea, as they cause a great outpouring of mucus and an increase in the peristalsis of the gut. Mucus now appears in the stools. Mucus consists largely of water, salts, and protein. The loss of water causes a continuous loss in weight. The excess of salts, especially of calcium, in part neutralizes and saponifies the free fatty acids. This results in the formation of soap curds and of fatty acid curds. Dehydration and demineralization of the body are therefore rapidly progressive, and, together with the protein loss, sooner or later will indicate a marked fall in weight and the inauguration of the intensive features of rickets, nervous phenomena (spasmophilia), anemia, and an increased susceptibility to infectious and exudative processes.

It becomes clear, therefore, that fat improperly utilized by the body becomes a factor of great importance in the production of alimentary disturbances and of abnormal nutritional states, rickets in particular, the prevention of which is largely dependent upon a sufficient supply of this same fat. In other words, if we would prevent and cure rickets, we must supply fat in form and quantity to insure its proper digestion and absorption. To supply fat does not mean to overfeed with fat. If we overstep the individual's tolerance for fat, we do him a serious injury. Briefly, it may be stated that it is the amount of fat which is absorbed which favorably influences the economy and not the amount which is fed. A fire may be put out by smothering it with large coal, when it will burn brightly if given a proper amount of small coal and sufficient draught.

TREATMENT.

The essential of treatment, therefore, will be to supply an amount of fat which can be digested and absorbed readily. This can only be determined by learning the individual's tolerance. Tolerance is a broad term, and since at present we possess no method of accurately determining this beforehand, some experience with and observation of feeding cases become necessary. It is good management to commence all feeding cases, therefore, on a comparatively low fat content and to distinguish between well babies and sick ones, and to understand that the tolerance of the latter for any food must of necessity be lower than the tolerance of the former for the same food. It is my custom to inaugurate artificial feeding in the new-born or very young infant with diluted skim milk in the proportion of about 3 or 4 ounces, or less, in 20, and to gradually increase this to 5 ounces of skim milk in 20, meanwhile noting the effect upon the stools and the stomach. Should these present no abnormalities, it is now safe to remove three-fourths of the cream before agitating and diluting the milk; in the meantime the pro-

portion of 5 ounces in 20 ounces is maintained. Then but one-half of the cream is removed; then but one-fourth; and finally well-shaken whole milk is employed in the amount of 5 ounces in 20 ounces. From this point, as digestion and weight indicate it, one ounce of diluent is replaced by one ounce of milk, and so on until whole undiluted cow's milk is reached. The amount of each feeding is gradually increased as determined by the appetite, the weight, and the caloric requirements. I prefer that all milk mixtures be boiled at least for five minutes. Antirachitic and antiscorbutic measures are of course employed.

With sick infants the details of the problem are somewhat different, although the essential principles remain the same. The stools must be carefully scrutinized and the irritability of the stomach determined, and the strength of the mixture which the infant has been receiving approximately estimated. In other words, it must be determined why the individual reacts abnormally to his food. We will assume a constipated anemic infant who vomits sour and is not gaining in weight. In the first place, investigation will usually reveal that the patient is being overfed—fed too much and too frequently, and that the composition of his food is too rich. A starvation period of twenty-four hours may be instituted, but is not always necessary. During this time it receives saccharated tea (saccharin gr. j to weak tea 1 quart), but no purgative is administered. The quantity of food in each feeding should be reduced, the interval perhaps lengthened, and the infant placed upon a skim-milk formula. The probabilities are, according to my experience at least, that the next thirty-six to forty-eight hours will show a gain in weight of from 3 to 5 ounces; that the baby will be more restful, although this is not always the case, as it may take a few days for the infant to become accustomed to its reduced rations; and that the bowel discharge will improve in character and in consistency. This latter result also is not always immediate. Meanwhile assistance may be

offered by suppositories, simple enemas of glycerin and water or of olive oil, but under no circumstances must purgatives be employed, especially castor oil. Occasionally milk of magnesia may be of service in that it assists in neutralizing any excess of organic acid. Frequently a change of the carbohydrate to one of the preparations of malt sugar on the market, instead of using cane-sugar or lactose, will not only overcome the constipation but will cause a rapid gain in weight. Malt soup extract also serves an excellent purpose in this type of case. Oatmeal water employed as a diluent also acts as a laxative.

From this point on, as tolerance is established, a gradual change is made from skim to whole milk dilutions, and the latter are gradually strengthened, as previously indicated under the management of healthy babies.

Assume now the other type of fat disturbance, the principal features of which are vomiting, diarrhea, green or greenish stools, with mucus and soft curds, and loss of weight, with perhaps some slight temperature. This baby is in greater immediate danger than the constipated baby, for the depleting effects are more acute. This baby must be placed upon a hunger period for from twenty-four to thirty-six hours, receiving naught but weak saccharated tea. If it be toxic, not less than from 2 to 4 drachms of castor oil are necessary. Castor oil, however, should only be given if it be toxic. This baby will do well either on diluted skim milk immediately employed or it may require preliminary treatment of a few days, during which time it should receive a highly concentrated protein milk in which the protein is mechanically divided. The protein will transform the contents of the gut from an acid-fermenting medium into a decomposing alkaline one—*i.e.*, the calcium casein excess provided by the high

protein food will combine with the fatty acids and produce a constipated calcium soap stool. In other words, we have simply completed the first stage of the treatment by transforming our baby with diarrhea into one with constipation resembling the first type of case just described, with the exception that the excess of lime has come from without by being supplied in the food and has not been withdrawn from the body—*i.e.*, by giving the excess of calcium casein we have neutralized the fatty acids in the gut, thus preventing them from abstracting these salts. We therefore make use of what, in the first instance, was a pathologic state and transform it for the time being into a benign one. From this point we proceed now as before with our skim-milk dilutions, gradually increasing as tolerance is established. A malt soup preparation may be employed. It is impossible to enter into the details of food preparation in this paper. It can only be mentioned that the excess of protein is provided by either Eiweissmilch (Finkelstein), Laro-san, or by buttermilk preparations, all of which are low in fat content.

It must also be mentioned that the intolerance for one element of food may induce intolerance for another or all of the constituents of milk, simply because the functions of the intestinal tract have been weakened. As a matter of fact, a combination of etiologic factors is often in evidence in the individual case as met in practice. Therefore, other maneuvers are often of assistance. Thus, boiling will assist in the digestion of the protein. A temporary reduction in sugar may be useful, or change, as before indicated, to maltose may be made. Protein and fat digestion are further assisted by pancreatization or by the addition of pulverized flour-ball and pancreatin to the food in conjunction with heating.

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UTERINE INERTIA.¹

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The factors concerned in labor are: (a) the powers, (b) the passenger, and (c) the passages. In a normal labor the active propulsive forces exercised by the uterine and abdominal muscles are just sufficient to overcome the passive resistance offered by the size of the fetus and the structures of the birth canal. If one of these factors be abnormal, labor will be delayed; but this may be of little consequence unless the abnormality is great; if two are abnormal, there is greater probability of a prolonged and difficult labor; if the three are abnormal obstruction will be complete. Even one abnormal factor may offer complete obstruction to the progress of labor, but it is less likely than if two or three factors are involved. On the other hand, instead of obstruction to passage of the fetus, excessive activity of the uterine or abdominal muscles, a small passenger in a capacious pelvis, or deficient powers of resistance, may induce a too precipitate labor, which is frequently associated with complications such as shock, laceration of the soft parts, inversion of the uterus, and rupture of the cord. Anomalies, therefore, whether relating to the powers, the passenger, or the passages, which disturb the equilibrium or balance between these factors, may result in more or less abnormal or delayed labor with or without serious effects to mother or child.

The following causes of prolonged or delayed labor may be quoted: Pelvic deformity; neoplasms encroaching upon the birth canal; malpresentations and positions of the fetus; rigidity of the soft parts; malpositions of the uterus; deficiency of uterine force due to general debility; premature rupture of the membranes; frequent child-bearing; age of the patient; intestinal disorders; oligohydramnios; polyhydramnios; pleural pregnancies; deficient uterine innervation; full bladder or rectum; mental influences; weak bearing-down efforts due

to general debility; great suffering associated with uterine contractions; the patient may be narcotized.

The prognosis in any case will depend: (a) upon the stage of labor in which the delay occurs, (b) upon the cause, and (c) upon the condition of mother and child.

It is not the writer's purpose in this brief paper to dwell upon insuperable obstructions to the progress of labor which may be relieved only by surgical and mechanical procedures. These are rare compared to the frequency of inertia in which the balance between power and resistance is slightly disturbed, involving a tardy passage of the child through the pelvic canal, associated with great distress and suffering on part of the mother. It is to uterine inertia in occipitoanterior cases that I wish to particularly direct attention, with the hope of eliciting a generous discussion which may further elucidate the subject and assist us in relieving the woman in the throes of parturition, without having recourse to violent or somnolent measures which may involve the integrity of her tissues or the safety of herself and child. The subject I believe is one worthy of discussion in view of the distorted ideas of so many pregnant, non-pregnant, and childless women in reference to the treatment of physiological labor by bizarre and spectacular methods which have been lauded by magazine writers and advertising physicians.

I am well aware that in no two cases of labor is the course of the process precisely similar, although the vast majority are from first to last perfectly normal. Sudden and unlooked for changes may occur in an ordinary case. Much may depend upon the temperament and constitution of the woman. A thorough physical examination of the patient should be made at regular intervals, particularly during the last trimester of pregnancy. Her dietetics should be guarded, urine analyzed, blood-pressure taken, errors of metabolism cor-

¹Read before the West End Medical Society, of Louisville, Kentucky, Jan. 9, 1917.

rected, position of the child diagnosed, fetal heart auscultated, elimination stimulated, and the pelvis measured.

As the general constitutional state of the patient may materially influence the efficiency of uterine contractions, as high a standard of health as possible should be maintained in the pregnant woman. As a prophylactic measure it has been clearly demonstrated by Bell, Duff and Edgar that strychnine judiciously administered during the closing weeks of gestation will so give tone to the uterine muscles and nerves, as well as to the entire organism, as to result in powerful uterine contractions during the process of parturition. Under its use the appetite improves, digestion is facilitated, intestinal action becomes more regular, insomnia is controlled, circulation is improved, labor is rendered more normal and less painful. One-sixtieth grain three times daily may be administered during the beginning of the last month of cyesis, to be gradually increased to one-thirtieth grain during the final week, provided there be present no well-marked contraindications. It is also claimed that after-pains are less frequent under the administration of strychnine. In vigorous women with good muscular tone, the use of strychnine is prohibited; but in the neurotic, hypersensitive, and debilitated, who constitute the majority of our pregnant clientele, it is to be strongly recommended.

Before making a diagnosis of uterine inertia, care should be taken to ascertain if the bladder and rectum have been emptied, and a thorough examination made of the abdomen by palpation. The uterine contractions will be found weak, for the organ will not assume the intense hardness associated with good muscular action. A vaginal examination will reveal the condition of the cervix, whether soft and patulous or hard and rigid. If the head has not entered the superior strait, the Walcher position should be used.

Rest in a tedious first stage of labor, particularly in the primipara, may be considered as indispensable for the relief of suffering, and useful in husbanding the

woman's strength for the trying ordeal to follow. The duty of the obstetrician is to afford a maximum of relief of suffering with a minimum of danger to herself and child.

In spasmodic rigidity of the cervix the administration of chloral hydrate ten grains every half-hour until three doses have been taken is the best method of securing relief to the cutting and grinding pains which produce intolerably acute suffering but with little effect on the progress of labor. It also acts as a relaxant to the hard and rigid cervix.

In patulous cervix uteri morphine and atropine, or still better morphine one-sixth grain with scopolamine (hyoscyne) one-two-hundredth grain, may be administered—only once.

In the apathetic variety of inertia, in which the first stage is inordinately prolonged, warm compresses to the abdomen will oftentimes stimulate uterine contractions. An enema or a hot sitz bath will answer admirably well in certain cases.

In the case of a pendulous abdomen the application of a firm abdominal binder may straighten the uterine axis and shorten the duration of labor.

The woman may fall asleep, awaken free from discomfort, and no labor pains occur for hours or days; but neither the woman nor the child is in danger while the membranes remain unruptured.

We may then repeat that, in the first stage of labor, the duty of the physician is to give the woman all the rest possible by chloral, morphine-atropine, or morphine-scopolamine. Should there be inefficient pains instead of complete inertia, warm lysol douches with hot compresses externally may be used.

In the second stage of labor the administration of the sleep-producing remedies mentioned is entirely out of place, as they may now tend to narcotize the child. Here quinine ten grains may be given, or twenty grains by rectum if the stomach will not tolerate it. In the woman with feeble heart, strychnine one-thirtieth grain should be administered. Many women in labor do

not know how to utilize the abdominal muscles to "bear down," and therefore exhaustion and not progress ensues.

The bladder should be evacuated if it has not occurred spontaneously. If the uterine and abdominal muscles do not respond to efficient action, palpation of the abdomen and digital examination should be resorted to, and if possible the cause of the delay determined.

Change of posture from the dorsal to the side to which the occiput points favors its rotation. The squatting position with the arms pressed against the abdomen, which is assumed by instinct by savages, favors the descent of the head in the pelvic cavity and strengthens the action of the abdominal muscles as well as the uterine contractions. This is the posture described in the Bible in the first chapter of Exodus. The objection to the squatting position is the greater danger of a prolapsed cord.

When the perineum is distended the multiparous woman should be delivered on her side, but in a primipara with slow stretching of the parts it is advisable to keep the woman in the recumbent position until the equator of the head is delivered, then she should be turned on her side. Chloroform or ether should be administered.

The physiological effect of great patience on the part of the physician, his orientation in the sick-room, and his resourcefulness in encouragement, are strong factors, by their emotional influences, in stimulating the pains of labor.

We may be guided by the rule that after two hours in the second stage with impaction of the head and no progress in labor, the forceps may be applied. Maternal exhaustion and fetal asphyxia are the cardinal indications for the forceps; but instead of waiting in cases of delay until the mother shows signs of exhaustion, or until auscultation reveals the fact that the child's life is in jeopardy, the careful and educated physician will anticipate and prevent danger. As Barnes has said, we should wait to see what the woman is able to accomplish, not what she can endure. I do not hesitate

to assert that the forceps when properly applied and skilfully manipulated by a judicious physician cannot possibly injure the mother.

Shall we use pituitrin in preference to delivery by forceps? The conditions necessary for use of the one are the same as for that of the other, viz., a vertex presentation and the passages open. The *vis a tergo* is assisted or relieved by an auxiliary force (the *vis a fronte*) by use of the forceps without danger; on the other hand pituitrin greatly increases the *vis a tergo* and endangers the integrity of the uterus by changing its normal muscular structure to that of tetanic contraction and producing violent expulsive action with injury to the soft parts.

As we will not give one-half grain of morphine to test its narcotic properties, I believe we are unjustified in experimenting with such an uncertain remedy as pituitrin for the purpose of saving time. Lee has condemned its use excepting in selected cases. Edgar in the last edition of his great book published a few months ago, after it had been tested in the hospitals of New York, says the action of the drug (pituitrin) is uncertain; that tempestuous contractions may follow when given in the face of too much resistance; that one cannot predict in a given case from the amount of the drug administered or the character of the inertia how powerfully it will act upon the uterus; that 0.2 gramme (one-half the usual dose) produced such prolonged and powerful contractions that uterine rupture was imminent and anesthesia was required; that in no stage should pituitrin be given unless anesthesia is at hand.

I repeat that we are not justified under any circumstances in endangering the life of the mother or injury to her soft parts by unnecessary and often dangerous experimentation for the purpose of saving time in our cases of labor.

DISCUSSION.

DR. H. J. PHILLIPS: Every medical practitioner has doubtless done something in obstetrics. Specialists in diseases of the eye, ear, nose and throat, in surgery, in

urology, have all probably attended par-turient women, and are therefore familiar with uterine inertia.

There are several varieties of uterine inertia: (a) where labor pains are inefficient; (b) where pains appear sufficient but do not overcome the resistance; (c) where the pains are terrific yet no progress is made. The latter type will oftentimes tax the ingenuity of the practitioner. Two methods of treatment are applicable, depending upon the condition present. The first is stimulation, where the pains are ineffective; the second, which is directly opposite, is sedation, where pains are terrific but no progress is being made and strength of the patient must be conserved.

Dr. Doherty has mentioned some of the most appropriate remedies: (a) morphine and scopolamine, which have been extensively used under the popular name of "twilight sleep;" (b) anesthetics, chloroform, ether, and nitrous oxide gas; (c) chloral hydrate.

The essayist has strenuously objected to pituitrin, yet probably every gentleman present will mention this drug in discussing his paper. It is remarkable in how many cases pituitrin has been used indiscriminately with no untoward effects. It has been said that cases suitable for the exhibition of pituitrin will get along very well if left to themselves, yet this drug may act as a "therapeutic forceps" and thus help the patient through the trying ordeal.

The essayist stated that 0.2 gramme of pituitrin caused ill effects. I fail to understand how three drops of pituitrin could have any influence whatsoever upon uterine action.

The most trying cases are those in which there has been no progress and the patient has become practically exhausted. An opiate is necessary in such cases to promote rest and allow the patient to regain her strength. While remedies should not be administered in a haphazard or careless way, I have always felt that it is advisable to get the patient through with her pain and trouble as soon as possible.

Many physicians dislike the practice of

obstetrics; they say that they "do not object to treating women and children if some one else will deliver the babies," and many of them would not answer an obstetrical call if they could retain their practice without doing this kind of work.

DR. C. L. NICHOLS: I have lately used smaller doses of pituitrin than formerly. Five minims will produce uterine contractions. Little difference has been noted between the results secured from five minims and one-half Cc.

No conscientious physician would think of giving pituitrin merely for the purpose of hastening delivery to save himself time. The patient should be carefully watched, and pituitrin administered in small doses at the proper time to facilitate delivery.

Simply because certain practitioners have had disastrous results is no reason why we should condemn a drug which will many times obviate forceps delivery. The following case is mentioned to illustrate this point: A multipara was having weak labor pains every half-hour; the cervix was dilated, but the membranes were unruptured. I could have administered pituitrin and delivered this woman within twenty minutes. I waited two hours for the nurse, there being no progress in the meantime, the pains not being sufficiently strong to cause engagement of the head in the superior strait. After the nurse arrived I administered five minims of pituitrin, and delivery was accomplished within half an hour. What objection can there be to such a procedure? Without pituitrin labor would probably have been prolonged and the application of forceps might have been required. When the time for labor has arrived I see no reason why we should not give pituitrin and complete the delivery.

Quinine in ten- to twenty-grain doses, as usually recommended, is more dangerous than one Cc. of pituitrin, and yet this drug is advised when uterine contractions are weak. It is recognized that large doses of pituitrin may cause violent uterine contractions and postpartum hemorrhage unless followed by ergot. Where pituitrin is used I always prescribe ergot for a few days

afterward, and have never seen any untoward results.

DR. H. L. READ: If Dr. Doherty knew more about pituitrin, I believe he would change his opinion concerning its usefulness. He is correct in stating that no one should administer as much as one Cc. of pituitrin as the initial dose. I have given this quantity, but will never do so again. He is also right in suggesting that before administering pituitrin the obstetrician should have chloroform ready, because the drug may act in two minutes or in fifteen minutes; it may produce a violent uterine contraction which will continue practically without intermission for ten or fifteen minutes. In such a case the woman is in danger and chloroform should be given at once, whether the fetal head is engaged in the pelvis or floating above.

The profession having at first called for a strong preparation of pituitrin, the manufacturers have placed it on the market in ampoules of one Cc. each, with the suggestion that the contents of one ampoule is an average dose. I have not given as much as one Cc. of pituitrin at a single dose in two years. I usually administer five minims, sometimes seven, and repeat the dose as required. When given in this way pituitrin is practically without danger. I give three minims in cases of uterine inertia, where the patient has been in labor twelve to twenty-four hours with no material progress. In the majority of such cases all the woman needs is a little assistance, and nature will do the rest. One dose of pituitrin merely starts uterine contractions. If a woman is delivered three hours after a dose of pituitrin, credit is not due the drug, as the effect does not last longer than an hour. This is the greatest effect of pituitrin, starting the uterine contractions, and when you have done that nature will assist in accomplishing delivery.

About two years ago I gave a woman one Cc. of pituitrin, and she was delivered within thirty minutes. The placenta was extruded a few minutes later. Everything seemed satisfactory and the woman was placed in bed. I was hurriedly recalled

within forty minutes because the woman had a tremendous postpartum hemorrhage. I believe this was due to the large dose of pituitrin, and if it had been reinforced by the administration of ergot hemorrhage might not have occurred. On another occasion I gave one Cc. of pituitrin, and the baby was born within forty minutes; there was a violent cervical contraction, and the placenta could not be promptly delivered. The woman had severe pain, the cervix was rigidly contracted, and the placenta was still in the upper part of the uterus. In this case also I believe the trouble was due to the large dose of pituitrin administered.

DR. E. H. KOCH: I have had more than the average experience with pituitrin. I have not hesitated to give it in doses of one Cc., and have never seen any serious results follow its administration in that way. On the contrary, bladder evacuation has been more satisfactory, alvine evacuations have occurred more promptly, and after-pain has been less. Pituitrin stimulates uterine contractions, and I do not understand how it could possibly produce postpartum hemorrhage. I recall a remark made by the late Dr. Murphy, of Chicago, a year or two ago, that all remedial measures should be used with brains; and that is the way I feel about pituitrin or any other drug used in the practice of medicine or obstetrics.

DR. J. E. HELMS: The practice of obstetrics is largely a matter of common sense, and no two women are exactly alike. When I am called to see a patient in labor and find a contracted os, I give a hypodermic injection of morphine with hyoscine or cactine. During the next three hours she may have a certain amount of uterine contraction, and at the end of that period pains will develop, the os will be found dilated, and labor will soon be consummated.

I have administered pituitrin in a number of cases in one-Cc. doses, and have seen no ill effect following its use. Prior to using pituitrin I saw several cases of hour-glass contraction of the uterus, and have seen a few such cases since I began the use of this drug. It seems reasonable to assume that

pituitrin might cause hour-glass contraction; the administration of ergot would certainly produce it if used indiscriminately.

I have used quinine in labor, and in one instance attributed the death of an apparently perfectly healthy fetus to the use of this drug. The child was born dead without any apparent cause, and I believe it was due to the administration of twenty grains of quinine.

As to common sense in obstetrics, I would like to cite an example occurring several years ago: Dr. Barbour, who was then professor of obstetrics in one of the medical schools of this city, sent two students to attend a multiparous woman in labor. They failed to accomplish delivery and sent for Dr. Barbour. After examining the woman he concluded that delivery was impossible, and asked me to see the patient and bring my craniotomy instruments. It was a face presentation. The patient was a large plethoric German woman with a pendulous abdomen and roomy pelvis; but the child was impacted, and it was impossible to introduce the hand in order to turn it.

The instruments were ready, the woman was anesthetized, and Dr. Barbour was about to begin craniotomy, but before doing so I suggested that the woman be elevated so just her shoulders would rest on the bed, to see if there was not enough "slack" in the abdomen for the child to recede. At first he was averse to doing this, saying he had never heard of such a procedure, but finally agreed to give the method a trial. The woman's nether extremities were drawn over the foot-board of the bed, and we then had no difficulty in reducing the impaction, applying forceps, and completing the delivery. The child was born alive and is living to-day.

This case is cited merely to illustrate what may sometimes be done by the exercise of judgment and common sense. To have treated that case according to our book knowledge, or what the books teach us, would have meant sacrificing the life of the child and perhaps also that of the mother.

DR. O. H. KELSALL: It is well that we

occasionally have an opportunity to listen to papers of the character Dr. Doherty has read, because some of the things once learned we sometimes forget. His mention of chloral hydrate as a means of hastening cervical dilatation is a good illustration. I remember having used that drug many years ago, during my internship at the Louisville City Hospital, with excellent results.

I have used pituitrin in many cases with no ill effect. I do not hesitate to administer it in doses of one Cc. As to Dr. Read's cases, and his reasons for attributing the unfavorable results to pituitrin, I do not understand how he can make such deductions. For instance, in the case in which within forty minutes he was recalled on account of postpartum hemorrhage, how does he know that it would not have happened had he not used pituitrin? How does he know that the woman would not have had a postpartum hemorrhage immediately after delivery if pituitrin had not been used? In my opinion by producing uterine contractions pituitrin postponed the bleeding, and if another dose had been administered probably the hemorrhage would not have occurred. The same statement is applicable to the case of cervical contraction. Such things occurred before we ever heard of pituitrin. If accidents of that kind were common in the experience of others, then I might give credence to his statement that pituitrin was the causative factor.

DR. J. D. TRAWICK: To the three postulates mentioned by the essayist there might be added a fourth, viz., the pernicious influence exerted by the nurse in the production of uterine inertia. Unless this fourth postulate is also eliminated, uterine inertia will be frequently observed.

Not infrequently it happens that the nurse will urge the patient to "bear down" from the moment she is brought into the case regardless of the stage of labor. Even before cervical dilatation has commenced the nurse will deliberately try to induce the woman to "bear down," and as a consequence the patient becomes exhausted from her efforts before labor has really started.

It must be remembered that when nature is ready for the woman to bear down, she does so involuntarily—she cannot help it.

The essayist is very specific in his recommendations concerning the administration of pituitrin. There must be: (a) a vertex presentation, (b) a perfectly dilated cervix, and (c) an occipitoanterior position, before he will permit the use of pituitrin. In my opinion the administration of pituitrin is unnecessary under such circumstances. Moreover, I believe pituitrin is yet in the experimental stage; it belongs to that class of remedies about which we know little or nothing, and until we can scientifically classify and apply our remedies, I believe we should be careful. I must confess, however, that some of the criticisms made tonight of pituitrin have been as inconsistent as the claims which have been made in favor of the drug.

Those of us who have had the privilege of visiting the Vienna clinics will recall how a large German nurse will grasp and manipulate the pregnant uterus with her hands; in this way engagement of the head is effected and delivery facilitated. The nurse does with her hands exactly what you are expecting to accomplish by the administration of pituitrin. The hands of a powerful nurse may be perfectly good obstetrical instruments sometimes; but we should not use the enormous force from behind produced by pituitrin in a delicate woman whose perineum is already about to rupture, and whose uterus has about reached the limit of tolerance.

Dr. Helms referred to the practice of obstetrics as a matter of common sense. I would like to amend his statement by saying it implies more than common sense. Scientific and expert obstetricians must use remedies according to scientific methods and principles.

Finally I wish to direct attention to the study of uterine inertia from the standpoint of infant mortality. Whatever may be the etiological factor of dystocia or delay in delivery, there is the underlying fact that the longer the child remains within the uterus, the longer it is pressed upon by

whatever the force may be, the greater the likelihood of (a) a dead baby, (b) craniotomy, and (c) injury to the mother. Therefore careful study of our cases is necessary to determine the cause of the delay in labor, and to decide upon the most appropriate method of treatment. When we have delivered a normal child without injury to the mother, we have accomplished two things: (a) we have conserved the life of the mother, and (b) we have presented to her a healthy baby.

DR. W. B. DOHERTY (closing): I must confess that my experience with pituitrin is limited to two cases. In the first I administered one Cc. and became very much frightened, as it produced the most tumultuous uterine contractions I have ever witnessed, and I feared rupture. In another case the same quantity was given with no effect whatever.

We should consider this matter from a strictly scientific standpoint. Why do you give pituitrin? It is administered to increase uterine contractions, to stimulate the *vis a tergo*; but you do not know just what may happen. Those who have had considerable experience claim that tetanic uterine contraction may occur at any time from the use of this drug.

As to the use of obstetric forceps compared with pituitrin: In the forceps you have a *vis a fronte*, you assist the woman by traction when the uterine contractions are insufficient to expel the child; but with pituitrin you are simply applying an inordinate force or stimulation from behind, and no one knows what danger may arise. Why should forceps not be used instead of pituitrin? If the os is fully dilated, the membranes ruptured, the passage clear, and there is no progress in labor, what objection is there to applying the forceps and assisting the woman? Is it not the safest plan to help her by gentle traction after the membranes are ruptured, the os dilated, and woman exhausted? Twenty minutes to half an hour is the time usually required to accomplish delivery with forceps. With pituitrin terrible damage may be done; there is no *vis a fronte*, it is entirely a *vis a*

tergo. I wish to insist that forceps should be used in every case in which the progress of labor is delayed beyond two hours in the second stage in occipitoanterior cases. It is safer to use the forceps than pituitrin.

We are told that one Cc. of pituitrin will produce uterine contractions which will persist for five minutes. That is something no woman can withstand. Normal labor pains do not last longer than two minutes. No woman can withstand severe uterine contraction for a greater period of time than two minutes, and then she must be allowed to rest.

I am willing to admit that good might be accomplished by the use of pituitrin if we knew more about its indications, method of action, indications, contraindications, etc.;

but unfortunately no one is able to foretell the danger which may arise from its administration. Ergot could undoubtedly be used in all cases in which pituitrin is recommended with only five to ten per cent unfavorable results. Then why not use ergot? It will produce tonic contractions of the uterus and may result in great danger.

While the observations of one man may be as valuable as those of another, the conclusion of those having the greatest experience in obstetrics is that we do not know how to use pituitrin with safety, how frequently it should be given, nor in what dosage. Edgar and Lee claim it is an exceedingly dangerous drug, and like ergot I believe it will be relegated to the storehouse of oblivion before many years.

CLINICAL OBSERVATIONS ON SOME PHASES OF THE TREATMENT OF DISEASES OF THE HEART AND THEIR SEQUELAE.¹

BY ROBERT ABRAHAMS, M.D.,

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Until the ideal treatment of acute and chronic diseases of the heart is discovered, drugs will be the mainstay and the indispensable agents in those affections. The ideal treatment will follow definite knowledge of the bacterial or other agencies which produce each and every lesion of the heart. The dawn of such a therapeutic millennium is seen creeping and breaking on the medical horizon. Thus serums, vaccines, and chemical compounds like salvarsan, are employed in cases in which the causative factor is known and settled. It is not so many years since septic endocarditis was the despair of the clinician, the opprobrium of the bedside. The adjective "malignant" vividly portrayed its dreadful nature. Today, many of us can point with pride to one or more cures of this heretofore hopeless malady. The results are obtained not by haphazard trial and speculation known as shrewd guessing, but rather by and through knowledge of the true nature of the causa-

tive organism. The millennium is on the way, but until it reaches its last syllable of recorded time we must approach the subject under discussion from the standpoint of practical, accumulated clinical experience; this experience is intimately and inseparably linked, and bound up, with drugs. The drugless treatment of chronic heart disease is the confused dream of medical somnambulists. All the celebrated "springs," and "baths," and "graduated exercises" are a disappointing bourne from which broken-hearted travelers return to kiss again the "ladies' fingers," botanically known as *Digitalis*. This is tragically true when sequelæ set in.

In the treatment of chronic heart disease, three points are to be kept in mind: (1) the condition of the heart muscle; (2) the nature of the defective valves; (3) the functional disturbance which, sooner or later, results from one or the other, or both.

Muscle degeneration requires treatment from the very inception of the trouble. Myocarditis implies, and produces, im-

¹Read before the New York Physicians' Association, March 22, 1917.

proper contractions, and no matter what factor or factors bring about the condition of the myocardium, the heart needs the strong, stimulating influence of a cardiac drug. Even though a known poison like syphilis produces the degenerative process, and antiluetic remedies be applied, yet digitalis or its equivalent must be given at the same time. This conviction is borne upon me every day. I hardly except the case associated with high blood-pressure. In such an event the digitalis should be given, combined or separately, with one of the nitrites. The compound nitroglycerin tablet, made after the Da Costa formula, is very suitable here. The point to remember is that digitalis is not to be omitted. In myocarditis associated with low blood-pressure the withholding of digitalis is rank injustice to the patient. The fear that digitalis, by increasing the contractions of the heart, may rupture the degenerated muscle of the heart is founded on a hoary but hollow superstition. The ever-present dyspnea demands the use of the drug.

Valvular disease may exist for years without in any material degree discomforting the owner. The absence of discomfort is due to perfect compensation. Under such ideal circumstances cardiac drugs are not only uncalled for, but are absolutely injurious.

Functional disturbance follows a great number and a great variety of cardiac affections. The causes are numerous and the manifestations are varied. For my part, every form of permanent, and some forms of temporary, or paroxysmal disturbance, in the force, rhythm, regularity, and rate, have a pathological basis. All the cardioneuroses have a pathological basis, although in some of them the lesion is impalpable and defies investigation. The subject is too large for one paper, and therefore I will limit myself to the discussion of a few types of functional disturbances of the diseased heart.

Extra-systoles associated with a normal pulse-rate, as a general rule, need no treatment. The extra-systole annoys some sensitive patients, but rest and reasoning quiet and satisfy them.

Auricular fibrillation is the most disturbing element in the function of the heart. To that condition of turmoil, riot, and delirium can be traced, literally and figuratively, rapidity, irregularity, annoying and alarming sensations—yes, even heart block.

A fibrillating auricle is most commonly seen in mitral stenosis, comparatively rare in aortic disease. But whenever and wherever it appears, it calls for treatment. Digitalis shows its fine hand in this cardiac and functional disturbance. The larger the dose the better and quicker the results. The dose is from thirty to sixty minims of the tincture every four hours until the impulses reaching the ventricle are decreased; thereafter the dose can be reduced to half this size.

The antithesis of auricular fibrillation is heart block. This disturbance may be aggravated by digitalis; the proper and perhaps the only treatment for this unpromising condition is rest in bed and atropine, subcutaneously administered. The dose ranges between one-hundredth and one-fiftieth of a grain every four or eight hours.

Although the etiology of the different lesions affecting the heart is far from being an open book, yet much of it is known, and many profit by it in the treatment of heart disease.

Mitral disease is distinctly rheumatic—using the term in the old sense. Syphilis cannot entirely be excluded, but as a common factor in mitral lesions lues is negligible. Rheumatism, as a rule, is a non-progressive disease. The rheumatic virus is quick and decisive in its action, selective in its point or points of attack, but after the mischief is done it retires to a state of peace. Its choice is practically limited to serous and synovial membranes, although not all of the serous membranes are its prey, for nobody ever heard of rheumatic peritonitis. What shall be the attitude of the physician in the presence of a well-compensated mitral lesion? The answer is, "Hands off!" But this is only true as far as cardiac drugs are concerned. There is, however, an important duty to perform. This duty can be crystallized in

the following three points: (1) Removal of all foci of infection, for which a search shall be made from the mouth to the anus; (2) the administration of iron to combat the ever-present anemia; with aloes or cascara to overcome the never absent constipation. The most prolific source of endocardial and valvular disease in children is the tonsils. I strongly recommend the enucleation of these organs, whenever they show a tendency to inflammation, or hypertrophy, or plugging of their crypts. This procedure is in line with good prophylaxis both before endocardial disease takes place or after it has developed. The removal of the tonsils in the latter puts a check on further destruction of the valves, membrane, and muscle of the heart. In adults the association of tonsillar disease with endocarditis is not so frequent, but when the combination is present the tonsils should be removed. The tonsil is like the appendix, only one hits the endocardium and the other flays the peritoneum. Both are trouble-makers, and just as the removal of an appendix is advocated after it has shown signs of lurking mischief, so must a refractory tonsil be dealt with. The sympathy that some of our brethren display for these lumps of lymphoid tissue, possessing plenty of potential danger, should make the angels weep. It is true that the tonsils are ancient organs and therefore deserving of respect, but their antiquity does not entitle them to more consideration than the ancient appendix vermiformis.

The third point to observe in the management of well-compensated mitral disease is periodic administration of sodium salicylate and sodium bicarbonate in doses of twenty grains three times a day for a week, to be repeated every two or three months according to the individual's susceptibility to the rheumatic "diathesis." Any one who tries this method or acts on this suggestion will benefit his patients and will recommend this practice to his colleagues. A parallel to this is found in the treatment of syphilis; for though there be no active luetic manifestations, mercury and iodides are given for the sake of safety and security. I entertain a

strong clinical conviction that the periodic exhibition of salicylates and alkalies in known rheumatics, though their cardiac and arthritic trouble is quiescent, serves an admirable purpose for the good and welfare of the afflicted individuals.

The management of aortic disease radically differs from that of mitral affections, because the etiology of the former radically differs from that of the latter. Aortic lesions are often syphilitic. The number of "aortics" which are not due to syphilis is negligible in the young and the middle-aged; in the old, aortic disease is an inevitable consequence of senile degenerative processes, and requires comparatively little medication. Now, since syphilis is the etiological factor and since syphilis is a progressive disease, it is evident that the moment the diagnosis is made the patient should be submitted to a well-planned anti-luetic treatment. This treatment includes salvarsan, mercury, and iodides. Salvarsan is well borne by a syphilitic heart no matter where the lesion is located. A Wassermann test is both desirable and called for, but if it proves negative, specific medication should be continued just the same in the hope that intensive treatment may result in a positive Wassermann. The periodic treatment of aortic lesions with mercury and iodides is essential to successful prevention of further destruction of the parts involved as well as limiting and checking the extension of the process to adjacent and contiguous parts like the heart muscle, the coronary arteries, and the arch of the aorta. This treatment is independent of the presence or absence of any degree of functional disturbance. Arsenic and iron are splendid adjuvants to the antisiphilitic drugs because in aortic affections there is always a great amount of anemia present. The same medication and the same management are applicable to syphilis of the heart and specific aortitis—all three frequently go together.

The appearance of sequelæ in heart disease is an announceent of failure of compensation and a summons to therapeutic action. The number of sequelæ and their severity are an index and a guide to the

amount and degree of ruptured compensation; for example, dyspnea on exertion means slight decompensation, while orthopnea indicates complete failure of the heart. The number and severity of the sequelæ constitute the measure of the therapeutic activity. Mild dyspnea is easily corrected by a few days' rest in bed with or without the use of digitalis; severe dyspnea demands both rest in bed and the liberal use of digitalis: either the tincture twenty minims t. i. d., or the infusion half an ounce t. i. d. Orthopnea requires much larger doses of the drug—from a half to a drachm of tincture three times a day until the distressing asthma is under control. Excellent and supreme as digitalis is in the management of this painful condition, it frequently proves inadequate. Morphine has to be resorted to—morphine subcutaneously, and in no other way. Morphine never fails to relieve and improve the terrible hunger for breath, the tightness of the chest, and the horrible choking sensation that go with shortness of breath. Anybody who ever watched a person suffering from severe dyspnea and noticed the rest, the sleep, the calm induced by one injection of a quarter of a grain of morphine, will never withhold it from the pitiful sufferer. The dose may have to be repeated in a few hours, but that does not matter. It is truly balm to the mind and to the sore heart rest.

Morphine, the greatest drug in creation because it is the greatest enemy of pain, is foolishly dreaded by many physicians in the management of the terminal stage of heart trouble. And yet it is the equal of digitalis and at times its superior. A combination of the two forms an ideal partnership which raises the tone of the broken heart and buoys up the dejected spirit of the victim.

Cyanosis as a sequel to heart disease is a twin sister to dyspnea, and consequently the management of one is the servant and handmaid of the other. Yet cyanosis has an additional remedy in venesection. Blood-letting in deep cyanosis may, in some cases, be credited with life-saving. Oxygen, which is resorted to so often, is of no value.

Dropsy is both dreaded by the patient and the physician. It is a formidable and stubborn sequel to cardiac disease. Its management, however, is in accordance with the amount of effusion. Small exudations, spoken of as edema, can be successfully removed by rest in bed and the tincture or the infusion of digitalis, 20 minims of one or a half-ounce of the other three times a day, continued as long as the edema lasts; thereafter half the amount, practically as long as the patient lives. Edema which extends to the legs and thighs is successfully treated in the following ways: Epsom salt or potassium bitartrate in drachm doses three times a day; digitalis in above-mentioned doses every four hours, continued until the effusion is visibly diminished. After that the cathartics are discontinued, but the digitalis must be kept up indefinitely. Or, if this method is disappointing, the Niemeyer pill may be used with benefit. The pill consists of powdered digitalis and powdered squill one grain each, calomel one-fourth grain; or the calomel is omitted, and in its stead blue mass or gray powder one grain may be used. Some prefer a capsule to a pill; whichever it is, it is given one every three hours, until at least twelve are taken.

In case of extensive dropsy or anasarca, the calomel treatment is ideal—3 grains three times a day for three days in succession. It may, and perhaps should, be combined with ten grains of bicarbonate of sodium. The addition of the latter helps to prevent ptialism. Calomel given in this dosage and for this length of time acts as a diuretic. In my estimation there is not a better diuretic in cardiac disease than calomel. I have used this drug in cardiac dropsy for at least twenty years "without regrets." I have used it in adults as well as children, the dose in children being two grains three times a day. Calomel in this condition exerts its action and effect upon the kidneys, so that at the end of the three days the patient begins to pass enormous quantities of urine. I saw tremendous anasarca disappear in twenty-four or forty-eight hours.

The effect of the calomel on the bowels is comparatively little. Most patients have no more than six or eight watery evacuations. Occasionally the calomel does not act until the patient receives two or three doses of diuretin. It seems that in some individuals the calomel needs a "chaser." The contraindications to the calomel treatment are: Bad teeth, soft gums, and chronic nephritis. A trace of albumin is no contraindication; as every cardiac who reaches that stage of the disease has traces of albumin in the urine. While the calomel is being taken, an antiseptic mouth-wash should be used every half-hour while awake; its use to be continued for a few days thereafter. The calomel treatment can be safely repeated, in case of complete or partial failure, in five days or a week. It must be recorded, however, that at times and for some unaccountable reason calomel completely fails as a diuretic. I noticed that the failures mostly occurred in those patients who had the dropsy for a long time, or in those cases in which the dropsy had reappeared for the fourth or fifth time.

When this treatment is unsuccessful, the next one may be tried: Calomel 2 grains, elaterin 1/10 grain, and compound powder of jalap 1 drachm, per dose—one dose every two hours until six doses are taken. This treatment forces the dropsy to make its exit through the rectum.

The next is the diuretin treatment: Diuretin 20 grains every two hours for twelve consecutive doses. The result sometimes is magical.

Mention must be made of a new preparation which frequently gives surprisingly good results, especially in mixed dropsy due to kidney and heart disease. I refer to cymarin. This drug is the active principle of apocynum. It is prescribed in silver-coated pills or ampoules; the latter is used in emergency and hypodermically. The pill is given every four hours until the desired effect is produced. I have often given two every four hours. The most recent case of

extreme anasarca that I saw was a patient of Dr. M. A. Goldberg. Cymarin tablets were given, two every four hours, with wonderful results.

Pricking the skin of the legs and employment of Southey tubes are valuable means to relieve dropsy, but one must observe extreme asepsis, as erysipelas or erysipeloid rash will appear, making the cure worse than the disease. In large and universal dropsies, digitalis frequently fails ignominiously; in fact, at times it does harm. Instead of increasing the flow of urine it either diminishes it or entirely suppresses it. It is best to dispense with it while a selected diuretic is administered. As soon as the flow of urine is well established and the swelling begins to go down, digitalis is given again with good effect. Milk should be the diet while the dropsy is raging, so to speak, eight ounces every three hours, and nothing else. It goes without saying that water in every form be withheld while the treatment lasts. So well an established surgical procedure as paracentesis, which is practiced by every physician, need not be discussed here.

Insomnia may be classed among the distressing and urgent sequelæ of heart disease. To treat this condition properly one must divest himself of the fear of morphine in heart trouble of any kind, for there is not a better drug to produce sleep in the unfortunate cardiac patients than morphine. The first dose should be administered subcutaneously; the second can be given by mouth. After morphine starts to do good work, sleep can be secured by any of the following hypnotics: Medinal, trional, or sulphonal. Medinal, in my estimation, is the best of all the hypnotics suitable for this condition. It is given in warm milk every three hours if necessary—a five-grain dose given to a patient who has never before taken a hypnotic is quite sufficient to produce six or eight hours refreshing sleep.

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EDITORIAL.

VALUE OF GENITO-URINARY ANTISEPTICS.

have often called attention in these to the fact that unless a drug has a molar affinity for some form of paraprotoplasm it cannot destroy this plasm without doing damage to the highly organized tissues of the human

It is this fact which stands in the way of the administration of so-called antiseptics in the treatment of many infectious diseases, and in the infections of the genito-urinary tract it has been urgently felt that something might be found which, when taken by the mouth, would be excreted by the kidneys and possess active antiseptic power. While the results along this line have been better than in the case of antiseptics in other parts of the body, they have nevertheless, been disappointing because this failure does not alone lie in the drug as just given, but also depends to some extent upon the pathway of infection. It is through the blood there is a secondary reinfection taking place in the genito-urinary tract, and this is possibly true when the infection is from below. One of the reasons which have been advanced, however, to throw doubt upon infection from below upwards has been that it seemed unlikely that microorganisms could find their way up the ureter against the stream of urine into the pelvis of the

By this connection an interesting contribution to the *Journal of Medical Research* has been made by Eisendrath and Schultz, who have demonstrated the presence of an anastomosing network of lymphatics in the wall of the bladder and of the ureter, communicating above with a similar lymphatic network in the renal pelvis and parenchyma. At its lower end this system communicates also with the lymphatics of the pelvic structures, in both the male and female. Other conclusions reached by these authors are as follows:

Infections of the bladder or lower ureter may reach the renal pelvis or the kidney, either by way of the lumen of the urinary tract or by way of the mural lymphatics.

Experimental and clinical evidence indicates that almost complete obstruction to the free passage of urine is necessary for the ascent of infection by way of the lumen of the urinary tract.

Experimentally they have shown that infection, set up by the simple introduction of bacteria into the bladder without injury or without obstruction, may pass upward by means of the interstitial lymphatics of the ureter.

The degree of involvement following the introduction of bacteria into the bladder depends upon the virulence of the organism and upon the susceptibility of the animal. The subsequent tissue reaction may remain limited to the bladder and ureter, it may pass upward to the tissues of the renal pelvis, or even the parenchyma of the kidney itself may become involved.

When the kidney tissue is involved in ascending infection brought about experimentally, as described, the path of travel is from the subepithelial tissues of the pelvis to the kidney by way of the intertubular and perivascular lymphatics.

From the kidney the perirenal tissues may become involved through the capsular lymphatics, which anastomose with those of the cortex.

The experimental evidence indicates that, in cases of pyelitis and pyelonephritis in the human, secondary to infection of the bladder, the lymphatics constitute the most important course of upward travel of the infection, especially in those cases in which there is no hindrance to the urinary outflow.

Pyelitis and pyelonephritis, not secondary to cystitis, may also be the result of lymphatic transport of infection from the pelvic organs in the male and female, and from the lower intestinal tract.

The extension of infection by these lymphatics is another adequate explanation

for the failure to do good of antiseptics administered by the mouth for elimination by the kidney.

THE WASSERMANN TEST IN CONNECTION WITH THE DIAGNOSIS AND TREATMENT OF SYPHILIS.

The month of January, 1917, brought forth the first issue of the *American Journal of Syphilis*, which is designed to inform the profession more and more concerning this universal disease, and it emphasizes the statement of Osler that if one knows syphilis in all its manifestations and relations he is practically familiar with everything in medicine, at least so far as pathology is concerned. This first issue of the *American Journal of Syphilis* contained a number of articles of the greatest possible importance, and we earnestly trust that the quality of the material may be maintained in future issues.

One of the most interesting articles is contributed by Craig, of the Medical Corps of the U. S. Army, and when it is recognized that the conclusions which he arrives at are based upon the results of nearly thirty-five thousand Wassermann tests, personally performed, it can readily be understood that his statements are authoritative, particularly when we recall the very important contributions which this eminent man has made to other forms of parasitic disease. The opening pages of his paper point out that the Wassermann test is the most valuable aid we possess in the diagnosis of syphilis. He also emphasizes the fact that many mistakes have been made in the interpretation of the results of the reaction, and that many of these mistakes have been due almost entirely to carelessness or inexperience. Also it will interest many of our readers to know that the exact nature of the reaction is still a mystery despite the immense amount of work which has been done in trying to solve this problem.

It is not possible to consider all the points he discusses in a rather lengthy contribution; there are, however, a number

which are of particular interest to general practitioner. One of these is confirmation of the results obtained early by Nichols and himself as to the effect of the ingestion of a considerable amount of alcohol upon the results of the Wassermann test. Further experience confirms him in the belief that the taking of alcohol in the form of beer or whisky in amounts equal to six ounces of whisky or one and a half pints of beer will often convert a positive reaction into a negative, the blood remaining negative for as long as three days although it generally reverts to its positive condition within twenty-four hours. Smaller amounts of alcohol will also render a strong plus reaction negative in certain cases, and thus give a wrong impression regarding the efficiency of any treatment which is being pursued. In other words, in making a primary test to determine whether the patient is syphilitic, the test must be made after the patient has been free from alcohol for some time, and when the test is used to gauge the efficiency of remedial measures the patient must be forbidden alcohol for twenty-four to thirty-six hours before his blood is taken. It is also interesting to note that the growth of various bacteria in the blood serum may give a false positive reaction with the Wassermann test. Although this has been known since 1911, Craig's further investigations confirm him in thoroughly believing this to be true—that is, common organisms such as the streptococci and the staphylococci developing in the blood serum may give a positive reaction when the patient is really not syphilitic. This observation is perhaps more important than that in regard to the effect of alcohol in producing a negative test, since it is conceivable that a positive Wassermann due to bacteremia may condemn a man to the belief that he was syphilitic for the rest of his life. Other points of interest are the recollection of the fact that the Wassermann reaction is absolutely specific for syphilis because other diseases may induce it. Of course in this portion of the world these diseases are exceedingly rare in the majority

Malarial infection occasionally gives positive Wassermann during the febrile stage as do yaws, relapsing fever, some cases of leprosy, and, more important to the general practitioner, cases of diabetes mellitus in which acidosis is present. Craig states that amongst four thousand patients suffering from diseases other than syphilis he obtained twelve positive reactions, or 0.3 per cent. Of this twelve, five were derived from tertian malarial infection; two were diagnosed tuberculosis; three, rheumatism; and in one the diagnosis was not determined. Vedder has obtained similar results in 1049 individuals suffering from diseases other than syphilis, or 0.4 per cent.

Every important point is the date of the appearance of the reaction in syphilitic infections, because the earlier the treatment is instituted in syphilis the better are the results. While it is true that the ideal method of diagnosing syphilis in the primary stage is by finding the spirochetes with the dark-field apparatus, this measure is sometimes unsuccessful. Craig differs widely from those who believe that the Wassermann test is of little value in the primary stage, and states that in his experience nearly ninety per cent show a positive reaction if repeatedly tested before the appearance of the secondary symptoms. He points out that thirty-six patients in the primary stage gave a positive reaction in the first week after the appearance of the chancre; almost sixty per cent during the second week; seventy per cent during the third week; and over seventy-seven per cent during the fourth week; during the fifth week after the chancre appeared it was positive in eighty per cent. This information is all the more valuable because the medical profession has always recognized that the clinical diagnosis of the primary stage of syphilis by determining whether the lesion is a Hunterian sore has been notoriously uncertain. Hundreds of cases have been labeled syphilitic because the sore was thought to be Hunterian, and hundreds of others have missed treatment because the opinion has been negative. Craig thinks

that, with the exception of the few maladies just named, the presence of a double-plus, or as some people call it four-plus, reaction is diagnostic of syphilis, absolutely, whether symptoms are present or not, and whether there is or is not a history of infection. A three-plus, or as some people call it a two-plus, may be regarded as diagnostic, provided there is a clear history of infection, or suspicious symptoms are present. It should not be regarded as absolute in the absence of associated facts. The diagnosis of syphilis should never be made in the presence of a plus-minus reaction, since many apparently normal individuals give this type of reaction. On the other hand, a single negative reaction should not be relied upon to exclude syphilis when any suspicion of this disease has been raised. Only when a negative reaction is repeatedly obtained for a long period of time in the presence of suspicion can the patient be given a clean bill of health. Equally important, when a patient has been under treatment and gives a negative Wassermann reaction he should not be given a clean bill of health from a single test, nor after several tests until a provocative dose of salvarsan has been given a year after treatment, when, if the reaction is negative, the spinal fluid should be tested and the luetin test applied. If all of these are negative the patient may be considered as free of the disease. It is to be recalled that a positive reaction induced by a provocative dose generally occurs within forty-eight hours, but sometimes this is delayed for as long as seven days. Craig believes that this test with a provocative dose is an exceedingly important one, and in some early primary cases in which the Wassermann test was negative the injection of a small dose of salvarsan promptly produced a positive reaction, a fact not to be forgotten. The dose used was usually 0.3 or 0.4.

In connection with cerebrospinal syphilis it is pointed out that the blood is often negative, although in paresis it is almost always positive. In many cases, too, the blood will be negative and the cerebrospinal fluid positive; indeed, no patient should be

considered as cured until the cerebrospinal fluid has been tested. In making these tests a proper amount of blood should be used—not less than one Cc., since smaller quantities may give a negative result. Thus, if one Cc. is used the blood or cerebrospinal fluid will give nearly one hundred per cent positive, but only about ten per cent if 0.2 Cc. is used. These facts hold true also in regard to locomotor ataxia.

In concluding his paper Craig reiterates his profound belief in the value of the Wassermann test as a guide to treatment. By its use one is able to diagnose relapses long before the appearance of clinical symptoms in the vast majority of cases, thereby instituting treatment in time. In other words, Craig believes that in many cases the first symptom of relapse is the recurrence of a positive Wassermann reaction, which may appear weeks, or even months, before symptoms develop. Many of the most serious late manifestations, as affecting the nervous system, have developed in patients who, twenty years before, had been given a clinical diagnosis of a cure.

Doubtless the thorough employment of the Wassermann test in future will save thousands from the disastrous and horrible late result of this disease, and the profession, as well as the laity, are once more under a debt of gratitude to the Medical Corps of the Army, as represented by Craig, for the splendid work which he and his collaborators have done.

In this connection attention should also be called to the paper by Peterson on the "Use of the Wassermann Examination in Obstetric and Gynecologic Practice." He points out that Colles' law that healthy mothers of syphilitic children may nurse their children without contracting the disease has been shown to be untrue in recent years largely through use of the Wassermann test. The mother does not acquire syphilis from her child, because she already has syphilis, as revealed by this test. In other words, the test has shown that under some circumstances a healthy child can be born of a syphilitic mother, and every mother of a syphilitic child has the

disease. Another point of importance recall that many functional disturbances in women, supposedly due to the derangement of the genital organs, may be due to unexpected luetic infection, and that women fail to recover their health after operation are often suffering from this infection, which will be relieved by specific treatment.

TOBACCO AND BLOOD-PRESSURE

It is a curious thing that a subject which is of so much general interest has received so little attention within recent years as to the relationship between the use of tobacco and blood-pressure. Ever since tobacco was first used there have been attacks upon its employment, and some enthusiasts have even been inclined to the belief that it actually produced criminal tendencies under conditions almost equally evil. Last year we called attention to an admirable article by Harlow Brooks on "Tobacco and Blood-Pressure" and we now call attention to an article by W. Gilman Thompson and William Sheldon, in the *New York State Journal of Medicine*, who have studied the effects of smoking in one hundred and nine experiments without reaching any very definite results. Most, if not all, of the experiments, however, were made upon men who already had developed arterial degenerative changes.

Physicians so often ask themselves the question as to whether the use of tobacco is harmful and are so frequently convinced by patients along these lines that our readers will be interested in the conclusions which Dr. Thompson and Dr. Sheldon have reached. These are as follows:

1. The maximum effect of cigar smoking was included in different cases within the limits of a rise of systolic pressure of 35 mm. and of pulse pressure of 22 mm. on the one hand and a fall of 30 mm. of systolic pressure and 34 mm. of pulse pressure on the other, the effects diminishing usually after about an hour.

2. In fifty-eight patients there was a rise of systolic pressure in 35 per cent

a fall in 45 per cent, the remaining 20 per cent being unaffected.

3. The results were not always uniform in the same patient when recorded at long intervals, the same patient sometimes exhibiting a rise and less often a fall in systolic pressure.

4. The results were not uniformly proportional to the degree of initial blood-pressure in the individual patient. That is, patients with an initial systolic pressure of 160 to 170 mm. showed as much variation after smoking as those with an initial pressure of 250 mm. or more.

5. In seventeen patients more than one observation was made, with a total of eighty-two experiments, to include the pulse pressure. In these cases the average rise equaled the average fall, being 11 mm.

6. The pulse pressure did not invariably rise with the systolic pressure, but occasionally fell or remained unaltered.

7. The effects of cigarette smoking corresponded in general to those of cigar smoking and were fully as variable.

8. Owing to the great variation in the effects of smoking produced in different patients, it is desirable that each case be separately studied before giving rules for controlling the habit. But it may be stated definitely that whereas the risk from an elevation in blood-pressure increases greatly the higher the initial pressure in the patient, it is undesirable for any one having a constant systolic pressure much above 200 to smoke; and secondly, smoking is equally undesirable for any one having a constant initial pressure above 160 mm. when the use of tobacco is found uniformly to produce a considerable rise in blood-pressure.

Summing up these conclusions, it would appear that when a man has a constantly high blood-pressure the use of tobacco is inadvisable, but otherwise we fail to see that any serious objection has been brought forward to its moderate use by healthy individuals, and when we use the term "moderate" we must consider the strength of the tobacco, the constancy of its employment, and the susceptibility of the individual in each instance.

TREATMENT OF HODGKIN'S DISEASE.

Hodgkin's disease, of unknown etiology, commonest of the primary infections of the lymphatic system, if tuberculosis be excepted, and with an acknowledged mortality of 100 per cent, has been the subject of intensive study, with an occasional announcement of temporarily helpful therapeutic measures. The study on the subject by Yates (*Wisconsin Medical Journal*, May, 1917), based on 63 cases, is of particular importance since he thus supplements his previous admirable work in this direction. In this number there are five acute cases and 58 chronic ones. He expresses the belief that the process is infectious, noting that, although it is non-communicable and that very few individuals are susceptible, after the process is once well established final spontaneous recovery seldom if ever occurs; yet throughout its course repeated and almost successful temporary defensive responses are manifested.

This is assumed to indicate that the infection is of low virulence, and that the affected individuals are incapable of a permanent protective reaction to the toxin, however it may be administered. These premises demand in therapeutic logic an early and adequate subtraction from the amount of the disease in order to place the balance of power emphatically and rapidly on the side of individual resistance and to maintain it there, through the elimination of every possibility of reinfection.

Further, this morbid process imitates the behavior of malign affections, notably of certain types of tuberculosis and of certain malignant neoplasms, especially the carcinomas, in so many details—as, for example in modes of dissemination, in direct extension, and in the nature of local and general resistance—that the nearly identical problems presented seem to demand the same solution. This is an additional indication for surgical intervention.

Finally, the rather numerous "cures" recorded in the literature, following an almost incredible number of methods of treatment, are without exception but temporary im-

provements. The improvement in the majority of instances occurred in spite of the treatment used, though in some doubtless it was fostered thereby.

Apparently a composite sequential series of treatments is demanded, including everything of proved or possible value, as it is quite out of the question, with one exception, to devise anything, however rational or irrational, that has not already been employed, all with the same ultimate results.

These conditions seemed to Yates to indicate the following methods:

To determine and to eliminate the portal or portals of entry of the infection, particularly those chronic lesions of skin or mucous membrane pointed out by Trousseau in 1865 and curiously never rediscovered, nor even given any practical recognition by therapeutists.

To extirpate so thoroughly all eradicable involved tissue in suitable cases as (a) to place the balance of power decidedly on the side of the individual instead of on that of the disease; (b) to eliminate this source of further infection and intoxication; and (c) to prevent subsequent physical and physiological debility through the continued growth of this tissue *in situ* and consequent pressure and irritation effects on surrounding structures.

To keep the balance of power on the side of the patient (a) by improving general health through hygienic measures; (b) to prevent by radiation, by immune serum, and by medication any extension of the disease; and (c) to repeat these treatments at intervals of a few months, unless other manifestations of progress of the disease, as determined by the patient's condition and especially by untoward changes in the blood picture, demand more frequent treatments or more radical interventions.

Three of these procedures require explanation.

It has long been held and frequently reiterated, notably of late years by Fischer and Dorothy Reed, that surgery, always of doubtful value, frequently was positively harmful, and that re-excisions were seldom if ever justifiable. These views were based

on the repeated observations that local recurrences, usually prompt, were the rule after the excision; and, moreover, that the recurrences often assumed a type more acute than the original process and were prone to hasten rather than to retard death. It has been seen such recrudescences appear within a week. The explanation is simple.

A portal of entry (inflamed tonsils, teeth, accessory sinuses, patches of dermatitis, bronchitis, enterocolitis, etc.) is comparable to a primary lesion in carcinoma, and the nomadic, disseminated processes. The records of earlier less radical surgical treatment show that these foci of dissemination were constantly neglected, and that therefore local re-establishment of the disease was a natural result, particularly since this affection seems limited at its inception to preëxisting lymphoid tissue, only secondarily extending therefrom to invade directly other tissues. Consequently if, in addition to this neglect, the primary excisions are relatively incomplete (and according to Yates's belief none is or can be actually complete in removing all potential lymphoid tissue), and are not therefore followed immediately and at intervals thereafter by intensive Roentgen ray treatments, distressing experiences and aggravation of the disease are almost certain to occur. In addition, the constant liability to septicemia must not be overlooked.

On the other hand, radical extirpation preceded by removals of portals of entry and followed by careful after-treatment have proved that in favorable (less advanced) cases local recurrence may be reduced to a surprisingly low percentage (possibly less than 5 per cent), and that when they do occur under these conditions they are usually late and have assumed a much more chronic type of lesion. Such late lesions may be excised safely under local anesthesia, but afterward the site of operation should be treated with the Roentgen ray as if this late procedure were primary.

If extirpation is not to be complete, it should not be attempted. Meddlesome surgery in Hodgkin's disease is even more dangerous than in cancer. Such wound

be treated with the Roentgen ray
ately and repeatedly, as even in acute
the liability to dissemination is thus
l materially.

ication of this group of cases has
ed since the days of Billroth in the
stration of arsenic. It is without
lasting virtue in any form yet avail-
om Fowler's solution to salvarsan.
specific chemotherapy is urgently
but wanting this, fresh air, sunshine
per feeding are infinitely superior to
ugs when there is no indication for
and the like.

covery can be accepted only when a
has been free from all evidence of
ease, including a normal blood pic-
or five years. This period exceeds
as can be determined the longest free
on record. In those rare instances
recrudescence the possibility of rein-
after a recovery has been estab-
must be disregarded until the nature
ethods of infection are determined
ely, even though there is evidence of
complete temporary protective reac-

erience is still insufficient to deter-
he nature of a "normal blood pic-
or individuals who have recovered
aving had the disease develop beyond
ipient stage. The specific toxin has
itive action on hematopoietic tissues,
n it provokes primarily a stimulative
on and later produces progressive
rative changes in these structures,
which regeneration becomes some-
proportionately and increasingly im-
e. Recovery occurring at any pe-
fter complete regeneration is impos-
s bound to exhibit some evidence
able to a cicatrix. It now appears
rt of such evidence is more or less
ent impairment of the functions of
hic tissue. Hence a subnormal
ocyte count need not of itself be indi-
of a persistence of the disease, al-
suggesting reduced resistance, if the
eatures of the morbid blood picture
eturned approximately to normal, as
ined not by a single count but by a

series of observations extending over sev-
eral months.

During the first year after the institution
of treatment, improvement, however re-
markable, and usually the first part thereof,
has furnished virtually all of the "cures" re-
corded in the literature as the result of any
method of treatment.

Therefore the results of a year or less in
duration should be termed "temporary."
During the second year a more accurate
judgment is possible, and the term "appar-
ent" is justified, as is also the term "prob-
able" during the third and fourth years. In
the fifth year and thereafter, the ultimate
results become relatively more certain,
though final judgment must be reserved
until a complete necropsy presents con-
clusive evidence years after recovery has
been accepted clinically.

The results of this most careful clinical
study are no more than encouraging; palli-
ations seem the rule, but cure must still
have a large question mark after it.

BLOOD-PRESSURE FROM THE STAND- POINT OF THE SURGEON.

Blood-pressure as an index of longevity
has been accorded increasing attention by
life insurance agencies and its value in de-
termining the individual's capacity for pro-
longed strain, it being widely discussed in
relation to the physical examination of some
odd million men shortly to be called into
military service. It is generally recognized
that a diastolic pressure is the best index of
arterial tension and of peripheral resistance.
In general terms habitual diastolic pressure
of over 100 should be regarded as abnormal,
as should a systolic pressure materially
above 160.

Mueller (*Medical Record*, May 12, 1917)
points out that the failure of the surgeon to
regularly record and observe blood-pressure
before operation is in many cases incident
to the circumstance that such patients are
sent by physicians to surgeons after they
have studied the blood-pressure and made
proper deductions therefrom and have esti-

mated the risk as a safe one to take. None the less it is undoubtedly true that before any major operation the surgeon should inform himself in so far as is possible concerning the competency of both the renal and the cardiovascular systems. The rough estimation of renal function is based on normal total quantity and specific gravity, a rough estimation of cardiovascular function on pressure, systolic and diastolic, recognized as somewhere near the normal.

Goepp states that the numbers 1, 2, 3 represent the value of pulse, diastolic and systolic pressures of the normal individual, and any considerable departure from this formula casts a doubt upon the risk of life insurance. This formula, however, holds only in normal cases, for it is a matter of clinical experience that individuals with high tension from any cause habitually show a pulse pressure in excess of the normal, say from 40 to 45 per cent instead of one-third. If, therefore, an individual with a high systolic pressure is to be considered at all as a possible risk he must at least show a pulse pressure slightly above the usual or normal. Goepp further states that it is well known that many individuals present habitually an abnormally high blood-pressure without showing any symptoms or pathologic changes to account for it, at least none that are discoverable by our present means of diagnosis, and yet the marked effect on life expectation of even moderately high blood-pressure is so convincingly shown by Fisher's statistics as to leave no doubt that, unless the condition which is responsible for the high pressure is removed, life will be shortened in a large proportion of the cases.

A systolic blood-pressure of over 140 mm. Hg, without other impairment, seriously affects the mortality; while applicants

presenting a pressure in excess of 150 Hg yield a mortality almost 50 per cent above the general average.

Individuals under forty years of age show even a higher mortality. Fisher's statistics show that single observations on blood-pressure are notoriously misleading, and statistical averages alone should rarely be relied upon. Single observations and general averages of blood-pressure values are more reliable. It is a common experience to meet cases of abnormally elevated systolic pressure, even continuously above 200, that are comparatively far less serious, prognostically, when it can be demonstrated that marked nephritic or myocardial changes are absent, than those with equally or less high pressure where the kidney and heart muscle changes have outrun the arterial.

As applied to surgery the blood-pressure readings are of value mainly as indices for further examination, particularly in relation to renal function. High systolic pressure in itself is certainly no contraindication to a surgical operation for the remedying of a condition which in itself is undermining health and may indeed be a contributory factor to this continued high tension. Supplementary examination which should be made of these patients, and this particularly when the pressure readings depart from normal, consists in judging the effect of exercise. This will at times detect latent weakness, perhaps suggested by high pressure readings, but not suggested by the appearance of the patient or by the history he gives at the time of examination. Heart overacting to moderate exercise and slow in recovery, particularly if this is accompanied by pronounced dyspnea, is always indicative of a vulnerable condition which leads to care in imposing a strain upon it.



REPORTS ON THERAPEUTIC PROGRESS.

INTRAVENOUS ADMINISTRATION OF MERCURY SALTS.

The *Wisconsin Medical Journal* for March, 1917, points out that in the modern treatment of syphilis, physicians are coming more and more to use the intravenous route to place drugs in the system. Salvarsan and mercury are the only two drugs which have proved their worth, and both in combination are generally admitted to be superior to either one alone. There is no reasonable doubt that syphilis can be cured by mercury alone. Inunctions are abandoned and the mercury is not always absorbed. Intramuscular injection of soluble and insoluble salts is often painful, and the violent reaction produced tends to limit the absorption of the drugs. One is really working blindly, for there is absolutely no way of determining how much of the injected drug is absorbed.

The intravenous method is the method of choice, but it has several disadvantages. The chief one is that a phlebitis is started which frequently causes thrombosis of the vein. Then, too, if the drug should not enter the circulation but ever so little be absorbed into the tissues, the most distressing and painful swelling of the whole arm results. To obviate this disadvantage recourse has been had to the mercurialized serum, an emulsion of mercury which is formed in bichloride and serum are placed together. However, it is not necessary to use this. One can inject a solution of bichloride directly if certain precautions are rigidly observed. The dose is from 1/6 to 2/3 of a grain every third or fourth day.

The technique which is found useful is as follows: The dose of bichloride is made up to about 3 Cc. with normal saline. A sharp-pointed, 20-gauge needle is then attached to the syringe, great care being used that the mercury solution does not get into the lumen of the needle. The arm is now constricted until the veins at the bend of the elbow stand out prominently. The skin is disinfected with alcohol and a quick thrust made

into a vein. The piston of the syringe is pulled out, when the blood will flow into the syringe if the needle is in the vein. The constricting band is then released, the solution injected, and the needle left in for two or three seconds. *Before withdrawing it, draw blood back into the syringe.* In this method there is no chance of even the least fraction of a drop of mercury solution getting into the tissues. If this technique is strictly carried out, the *Wisconsin Medical Journal* feels sure that there will be no phlebitis and no tissue reaction.

REPORT OF FIVE CASES TREATED WITH CYANOCUPROL.

In *Colorado Medicine* for March, 1917, KUNITOMO reports further on this new drug, already referred to in the *GAZETTE*. He reminds us that in August, 1916, when the *Journal of the Rockefeller Institute* published an article about Dr. Koga's cyanocuprol for the treatment of tuberculosis and leprosy, the public were very much interested as to its effects; but very few physicians made a clinical test with it. When Kunitomo received the first shipment of medicine from Japan, he thought it his duty to notify every member of the profession, at least those practicing in the State of Colorado. He received a landslide of inquiries; but unfortunately, either from lack of experience or on account of the expense of the drug, not many physicians gave treatment with cyanocuprol.

Cyanocuprol is a chemical compound, the components of which are copper and cyanogen. The compound, after being treated by a special method of detoxication, is colorless, transparent, and has a neutral reaction. It comes dissolved in a saline solution in the proportion of 1 to 500.

Summarizing his experience up to date, he says that there is no doubt as to the treatment with cyanocuprol having an effect upon tuberculosis. There is one feature which will require further study. It is the fact that every patient contracts a

cold between the second and fourth or fifth injection, but without physical damage. Whether this is due to a cyanocuprol reaction or other natural causes, he is unable to say.

THE INTRAVENOUS ADMINISTRATION OF QUININE.

The *Lancet* of March 3, 1917, editorially discusses this subject, stating that until the extermination of the mosquito is complete quinine must continue to hold its place in malarial countries as a prophylactic and curative agent, and in cases in which it is not tolerated by the stomach, or it is desired to obtain an immediate and powerful effect, the intramuscular or intravenous administration has to be considered. Intramuscular injection is painful and may give rise to points of local necrosis, but is generally held to be safer than the intravenous route, although in either case the injection of tetanus spores should not be lost sight of. Speaking from a very large experience amongst African troops during 1915, M. Braun, director of the Maroccan Service de Santé, states that ampoules containing 0.4 gm. of quinine hydrochloride in 1 Cc. of excipient, being non-isotonic and caustic, are liable to cause abscess at the site of intramuscular injection. Baccelli, who employed intravenous injection with much success in pernicious cases of malaria, used a solution made up as follows: Quinine hydrochloride, 1 gm.; sodium chloride, 0.75 gm.; distilled water, 10 gm. Apparently the fear of producing clotting in the vein is the chief drawback to this method, and in a paper by Captain A. C. MacGilchrist, I.M.S., this risk is fully considered, as well as the possible production of hemoglobinuria. Captain MacGilchrist concluded by advising a very dilute solution for intravenous use, viz., 7 grains of bihydrochloride in 2 to 3 pints of saline fluid. The work of three physicians, Dr. German Arellano, Dr. F. G. Miranda, and Dr. Fausto Robleto, at the San Juan de Dios Hospital in Granada, Nicaragua, suggests that Baccelli was right and that concentrated solutions of quinine can be injected safely into a vein. They

have gone even further and find that solution need not even be isotonic with blood serum. Dr. Arellano and his leagues speak of being daily confronted during the rainy season with rapidly forming forms of pernicious malarial fever, have found nothing so efficacious in the face of impending death as the intravenous injection of quinine. Concerning its administration they write:

"The first time that we employed this method with the happiest and most successful results, we were able to use Parke, Davis & Company's solution of quinine sodium chloride and other salts; but unable to obtain the isotonic ampoules, we had no choice but to use the acid non-isotonic solutions of the chloride, bichloride, chlorhydro-sulphate of quinine, as supplied in ampoules by Parke, Davis & Company, Clin of Paris, and others, diluted with an equal volume of warm sterile water. The results are simply marvelous, and we have never had the least trouble or accident. So sure, safe and efficient do we consider this method to be that we employ it now even in cases showing no signs of perniciousness. The patients merely complain of vertigo, deafness, transient nausea, and a sense of heat spreading all over the body within one to ten minutes after the withdrawal of the needle.

"In all cases of pernicious fever we have found the worst symptoms, such as amaurosis, convulsions, algidity, and coma, to disappear from three to six hours after the injections, though cases have occurred in which the patient was in danger within the hour. The dose employed is 10 to 25 or even 50 centigrams according to the age, state, condition, and symptoms of the patient. Children are subjected, when the veins are accessible, to the same treatment. In fact, in children it works wonders. Now, as it may be asked why we have not used Baccelli's formula, we will frankly state that in this town there are no pharmacies really reliable in which such solutions might be aseptically prepared, a fact which has led us to a preference to solutions which, acid tho

be, are most certainly aseptic and properly dosed. The technique we employ is as follows: We mix the solution within the syringe with an equal amount of sterile water, taking care that no precipitate or flocculum is formed as the blood comes in contact with the solution. It has been observed at times, especially when time is wasted in inserting the needle, that a kind of white precipitate is formed very similar to that of 'alumine' when injected intravenously; but, as in that case, experience has shown it to be perfectly safe, it being a sort of collo-suspensionoid."

The authors add that at first their procedure was severely criticized by their local colleagues, and in the daily press, until their experience showed its safety. They give no explanation of the non-coagulability of the blood by the acid non-isotonic solution, but commend other workers to test the matter for themselves.

NATURE AND TREATMENT OF SCIATICA.

Colorado Medicine for March, 1917, pointing out that it is to be remembered that the sacroiliac and the lumbosacral joints may be inflamed and swollen as the result of infection or subinfection. Possibilities of absorption are to be thought of, such as bad tonsils, pyorrhea, or hidden foci of infection.

Another source of referred pain is to be found on the nerve roots from disease of the spine, such as osteoarthritis. In such cases the sciatica is usually bilateral, but may be unilateral.

Then come to what may be called the traumatic sciaticas, the ones that are of the nature of a neuralgia, a neuritis, or both. This is not a neuritis due to toxemia or a systemic disease like syphilis or diabetes, but should use mild measures first, such as rest, stimulation of elimination, and counter-irritation.

The patient should be in bed in a comfortable position with the thigh slightly flexed and the knee flexed so as to take the pressure off the nerve. Elimination is helped

by light diet, plenty of water, and the administration of salicylates in large doses.

Counter-irritation can be applied along the course of the nerve by means of small fly-blisters, whose location can be changed from day to day, or by the mild use of the Paquelin cautery.

If these means fail, more strenuous measures must be tried. Stretching of the nerve, once popular, seems to have been abandoned, and injections of the sheath of the nerve have taken its place.

The best place to inject the nerve is where it crosses the spine of the ischium. To locate this point on the surface, measure from the middle of the lower end of the sacrum to the upper end of the posterior border of the great trochanter of the femur. Find the junction of the inner and middle third of this line and measure one inch further. This point is also at the junction of the middle and inferior third of a line from the posterior superior spine of the ilium to the upper end of the tuberosity of the ischium. Having been found, it should be marked with nitrate of silver so that it will not be erased by the subsequent disinfection of the skin.

Various solutions have been used, from salt solution to dilute alcohol. The safest and best is probably as follows: One and one-half grains of novocaine are dissolved in three and a third ounces of physiological salt solution. This is sterilized by boiling, and then ten to twenty minims of a sterile one-to-one-thousand solution of adrenalin are added. About two ounces of this solution should be used.

The needle should be four inches long, strong, and with a beveled, not a sharp, point. The syringe should hold three ounces.

The operation must be done with aseptic precautions. With the patient prone the needle is inserted till it reaches the nerve, and then the solution is slowly injected.

The nerve is reached at varying depths, but not over four inches. Sudden pain in the course of the nerve gives notice that it has been reached.

This treatment usually gives relief and

sometimes cures, though it may have to be repeated. It seldom does harm.

If injection of the nerve trunk fails, the epidural injection of cathelin may be tried, especially if there is evidence of irritation of the nerve roots.

The needle is introduced perpendicularly in the midline, three inches from the tip of the coccyx, until the sacrococcygeal ligament is pierced. It is then pointed upward so as to enter the sacral canal without penetrating the dura mater, and introduced to a depth of one and a half to two inches. Two cubic centimeters of a one-per-cent solution of cocaine or 4 cubic centimeters of a one-half-per-cent solution of novocaine are injected.

SALVARSAN AND ITS SUBSTITUTES.

In the *Practitioner* for March, 1917, BUNCH in writing on this subject states that the latest antisyphilitic remedy, or substitute for salvarsan, is a French one named luargol, or "102," which has been used at the Hôpital Cochin in Paris and elsewhere with apparently great success. Luargol is a yellowish powder, soluble in sodium hydrate solution to the extent of 1 gm. to 0.4 Cc. of the soda solution, but it is insoluble in water. The powder dissolves best and most quickly if one gramme of it is added to 15 Cc. of a 4-per-cent solution of sodium hydrate. The solution is then dark-brown in color, or almost black, and it is injected intravenously in the same way as salvarsan, either in concentrated solutions, as in Ravault's method of injecting neo-salvarsan, or in dilute solutions by a syringe with a three-way tap. The concentrated solutions must be injected slowly, and care must be taken that the needle is actually in a vein. Indeed, it is better after inserting the needle to make sure that it is in the vein by first attaching to it a syringe containing normal salt solution and injecting some of this. If it passes into the vein this syringe can be detached and a similar syringe containing the luargol solution fitted to the needle, and the injection of luargol made. When using a concentrated solution, the

first dose given is 15 Cc. of a 1-per-cent solution, and five subsequent injections are given at intervals of two or three days 20, 25, or 30 Cc. When dilute solutions are used, it is best to use a 1-in-1000 solution and inject 150 Cc. for the first dose, gradually increasing the dose to 300 Cc. The intervals are the same, namely, two or three days, and six injections should be given, so that the patient gets from 0.5 gramme to 1.5 grammes of luargol in all. The patient should go without food for four hours before and four hours after the injection, and should lie down after the injection. In cases with nervous or other complications, the dose must be diminished in children and women, and in kidney affections, heart disease, and syphilitic meningitis, the dose must be quite small to begin with.

The chemistry of luargol is somewhat complicated. It is an arsenobenzol compound combined with silver. Silver nitrate has, of course, long been used for syphilitic plaques, and colloidal compounds of silver as injections in septic conditions. Charcot showed how little poisonous silver is—indeed, poisonous symptoms were shown to appear only after absorption of 30 grammes of silver nitrate. Danysz, of the Pasteur Institute, tried to combine silver with an arsenobenzol compound, by mixing a solution of silver nitrate with a watery solution of dioxy-diamino-arsenobenzol. A clear brownish solution resulted, and when sodium chloride was added to this a flocculent precipitate formed. On the addition of sulphuric acid a pale-yellow precipitate formed, and the fluid contained only traces of arsenic and silver, showing that silver and chlorine had been fixed by dioxy-diaminobenzol. Danysz then proceeded to replace chlorine, which has no therapeutic use in syphilis, by bromine. He thus obtained a bromo-silver-arsenobenzol, which proved very efficacious, and which is called "88.2." To improve the efficacy of this drug, he proceeded to add to it some trichloride of antimony, and so arrived at luargol, or "102." Luargol, therefore, contains silver, bromine, antimony, and 20 per cent of arsenic.

leeping sickness, luargol is 75 times more active than atoxyl, 30 times more than arsenophenyl glycine, and 10 more active than arsenobenzol. 's experience shows that "102" has curative powers in trypanosomiasis by other arsenical compound. Thus, lution of surra in rabbits is about the s the evolution of trypanosoma in Fever and wasting follow an incubation of five to seven days. Skin and membrane lesions appear thirty to days after inoculation. All arsenical nds cure the animals, if treatment is during the incubation period. If nt is started during the second arsenobenzol, atoxyl, and arsenoglycine give only a percentage of while "102" cures them all. When have appeared during the last period, lone can cure five out of six cases, dose of 0.01 cg. per kilogramme. rsenical compounds in the same dose d no beneficial results on the ani- it is remarkable how low the toxicity ol is, as compared with other arsen- eparations similarly injected—in words, one-fiftieth, or less, of the ose will have curative results in the . One-tenth of a gramme is a very ose, and yet this is the initial dose ended in the treatment of syphilis les—in males it is a little higher— quantities of luargol required for e of syphilis are very much smaller salvarsan, neosalvarsan, or other te. e employment of all these arsenic nds, unfavorable complications nes follow their injection. Throm- f the vein may occur, if the solution properly prepared or the soda used tralizing the solution is not chemi- ure. Sometimes there is a rise of ature, vomiting, headache, or gastro- al symptoms, and a scarlatiniform s been seen. Still more severe symp- f poisoning occasionally occur, such ulsions, dyspnea, congestion of the accompanied by well-marked fever, as been shown by Danysz that such

symptoms are always due to a precipitate of arsenobenzol in the circulatory system, and generally in the capillaries of the lungs, such as is brought about by an excess of phosphates and certain other salts in the blood. Such accidents can best be avoided by using a dilute solution for injection in preference to a concentrated solution.

Difficulty has lately been experienced in obtaining chemically pure sodium hydrate to dissolve the luargol, and this has accounted for some of the unfavorable results, but in future a sodium preparation of luargol will be placed on the market, which dissolves in distilled water like neosalvarsan, and possibly toxic symptoms caused by the use of improperly dissolved luargol will be eliminated.

THE TREATMENT OF LIVER ABSCESSES BY INTRAHEPATIC INJECTIONS OF EMETINE FOLLOWING ASPIRATION.

In the *Calcutta Medical Journal* for January, 1917, GHOSH says that there is one consideration worth remembering in the treatment of cases of liver abscess. It is the fact that all amebic abscesses, when they are of any size, require evacuation. He is not speaking of the very rare case of a small abscess or a case of doubtful suppuration. Rogers recommends this plan, prior to hypodermic injections of emetine. Foreign observers, too—for instance, Joseph Smits, of Sumatra—write from a large experience of cases that "liver abscesses should be evacuated. They do not yield to emetine injections." He clearly means to say that emetine injections alone do not suffice. Well, if that be the general experience and consensus of opinion, and the aspirator has to be used, is it not best to throw in a quantity of emetine in more or less direct contact with the amebæ at the same opportunity and cause no additional risk or trouble to the patient?—rather giving him a quicker cure. There would, indeed, then be a more or less direct kind of treatment against the amebæ in their most vulnerable form. Besides, a much stronger solution than that which is possible by

hypodermic method can thus be brought into contact with the amebæ, while no toxic symptoms are to be feared even, in spite of big doses like a grain and a half at once, as shown in two cases of the writer's, and especially in a boy who was only fifteen years old. He trusts that by using initially a still bigger dose, 2 grains or so, we can curtail the number of subsequent injections and the total expenditure of the drug. It appears then that on theoretical grounds, and on grounds of practically achieved results, the merit of this plan of treatment seems beyond question. And Ghosh says that the achieved results certainly justify the adoption of this plan of treatment in all cases of amebic abscess of the liver.

MODERN METHODS OF BLOOD TRANSFUSION.

LEWISOHN in the *Journal of the American Medical Association* of March 17, 1917, states that when he began animal experiments with sodium citrate with the object of using this drug in human blood transfusion, he did not by any means apply a new drug which had never been used before as an anticoagulant. In fact, sodium citrate was known as the most efficient anticoagulant, and was used extensively in laboratory work. A one-per-cent mixture of sodium citrate and blood was considered necessary for the prevention of coagulation. Furthermore, it was generally assumed that such a mixture would be toxic when used in the human being.

His experiments were carried out with the object of answering the three following questions:

1. What is the smallest dose of sodium citrate required to keep the blood from clotting?
2. Is sodium citrate atoxic in the amounts required for our purpose?
3. How does sodium citrate affect the coagulation time of the blood?

The results of these experiments were published *in extenso* in 1915. Lewisohn therefore mentions only his conclusions:

1. Two-tenths per cent instead of one

per cent is the percentage of sodium citrate and blood required for the safe prevention of coagulation. Such a mixture prevents coagulation of the blood outside the body for from two to three days.

2. Five grammes of sodium citrate can be introduced safely into an adult. Much larger amounts are extremely toxic. He transfuses more than 1000 Cc. of blood which would represent 2 gm. of sodium citrate. However, even a transfusion of 1500 Cc. of blood would require only 1.5 gm. of sodium citrate, a perfectly safe dose.

3. The introduction of citrated blood causes a temporary shortening of the coagulation time of the recipient's blood. The coagulation time returns to its pre-transfusion level usually in less than twenty-four hours.

Before leaving this subject, Lewisohn would like to point out how the whole applicability of sodium citrate in human transfusion is based on the development of the small dose (0.2 per cent). This fact was the most important result of the experiments mentioned above.

The technique of the citrate method can be divided into two separate actions, both of them well known to any practitioner. One is the venipuncture or, in exceptional cases, venesection of the donor's vein; the other is the intravenous infusion of the citrated blood into the recipient.

1. Obtaining the blood from the donor. A tourniquet is applied to the donor's arm and one of the larger veins in the upper arm region (usually the median cephalic vein) is punctured. A cannula of large diameter is used in order that the blood may flow rapidly through the needle. The blood is collected in a graduated glass jar which contains at its bottom the two-per-cent sodium citrate solution. If we want to give 450 Cc. of blood, we add 50 Cc. of this solution, thus effecting a two-per-thousand mixture. Smaller and larger amounts of blood are treated proportionately. It is important to take good care that in mixing blood with citrate the proportion is never less than two per thousand. In order to prevent any occurrence it might be advisable to add a few cubic centimeters of surplus citrate.

tion, which can be done with perfect safety.

Infusion of the blood into the recipient. The recipient is usually so anemic that it is needful to expose the vein by a small incision in about 80 per cent of the cases. A cannula is inserted, and the latter is attached to a salvarsan apparatus which contains from 20 to 30 Cc. of physiologic sodium chloride solution. The blood is then drawn into this apparatus and allowed to flow into the punctured vein by gravitation (exactly like an ordinary saline infusion). The technique of this method is certainly very simple. It has the further advantage that no special apparatus, not even a trocar, is required for its use. A trocar, a piece of rubber tubing, a glass funnel, and a few grammes of sodium citrate represent the whole outfit. We often forget that these methods should be applicable not only in well-equipped hospitals, but also in a small village. Lewisohn thinks any physician practitioner ought to be acquainted with this simple method. Many a life could be saved, especially as this method has the further advantage that the blood can be carried from one place to another. It has been carried 70 miles before being injected. Burmeister has even taken a step farther and advised the storage of a erythrocyte-citrate emulsion for emergency use. There is no doubt that citrated blood can be kept for hours and possibly for two days, and then injected without harm to the patient. This procedure should, however, be applied only in exceptional cases, as possibly hemolysis and other physiologic changes in blood so kept do not make it quite as safe and efficient as blood which is transferred from donor to recipient at a short interval.

Wassermann test must be made in the donor, particularly the professional donor. Furthermore, the blood of the donor and recipient must be tested in order to prevent hemolysis and agglutination. These tests can be done in a very few hours and need not be applied, except in cases of grave emergency. The opinion has been expressed by different men that these tests are

unnecessary. Rather large series of transfusions without tests have been reported, and the absence of any symptoms of hemolysis has been made use of as proof for this contention. This, however, is misleading. It is perfectly feasible to perform twenty transfusions without tests and without serious accident and to have the twenty-first patient die on account of serious incompatibility of the blood of donor and recipient. Such an accident can be avoided easily by proper laboratory tests. Thus to endanger the life of a patient unnecessarily is foolhardiness.

The following important facts ought to be kept in mind in connection with this question: (1) Donors cannot be used a second time for the same patient without another test as to hemolysis and agglutination. (2) Blood relatives (parents and children, brothers, etc.) have to be tested just as thoroughly as strangers, as their blood often is very incompatible in spite of their near blood relation. Cherry and Langrock have asserted that in new-born infants the mother's blood can always be used with perfect safety for a transfusion. Other workers, however, do not agree with this statement.

THE TREATMENT OF DUODENAL ULCER FROM THE MEDICAL STANDPOINT.

In the *New York Medical Journal* of March 17, 1917, BASTEDO in discussing this subject says that in the main the treatment consists of antacids, demulcents (bismuth and oil), and laxatives—i.e., drugs to combat hyperacidity and hypersensitiveness with pylorospasm, and measures to avoid intestinal stasis. For example, at the outset one might use: (1) Sodium bicarbonate, half a level teaspoonful in half a glass of water between feedings, four to eight times a day. That this sets free gas when in contact with acid has not proven clinically to be a bar to its use. (2) The milk of magnesia, one-half to one ounce with water two ounces, at bedtime, or magnesium oxide, ten grains, mixed with sodium

bicarbonate and given during the day. (3) Bismuth subcarbonate, thirty grains, with a little water three or four times a day. This drug is not astringent, but is demulcent or protective. It may be given every two hours in ten-grain doses, alternating with sodium bicarbonate, or mixed with it. (4) A soap-suds enema daily if needed.

At the end of the second week, for thorough cleansing, castor oil, one ounce, may be employed, or calomel, two grains at night, $\frac{1}{4}$ grain every quarter-hour, followed next morning by a saline cathartic. After that, or from the beginning, a mineral oil one-half to one ounce may be given two or three times a day. The advantages of the mineral oil are that it tends to decrease acidity and sensitiveness, to relax the pylorus, to soothe the ulcerated area, and to act as a laxative. When the patient is up and about one may allow a nightly dose of phenolphthalein or cascara, or an aloin, belladonna, and strychnine pill. It is not to be expected that a cure can be obtained unless the bowels are kept in good order. Atropine has been much employed to lessen hypersecretion and overcome pylorospasm. Bastedo has experimented much with this drug and believes that it does not have these effects unless it is administered hypodermically and in maximum doses—i.e., doses that will produce dryness of the throat, dilated pupils, or cerebral excitability. These pharmacological actions preclude its frequent use. Chlorosis, but probably no other form of anemia, may be successfully treated by daily hypodermics of 0.5 to 1 Cc. of a ten-per-cent solution of iron and ammonium citrate.

The so-called "empty pain" may be due to hunger contractions, spasm of the pylorus, free hydrochloric acid, or acids of fermentation. If there is fermentation, as in retention cases, this "empty pain" may be present, even though there is plenty of food in the stomach. Any pain from acids is probably due to the induction of hunger contractions, for in six cases of stomach ulcer Hertz gave four ounces of 0.5-per-cent hydrochloric acid with no pain, though

this strength of acid hurt when applied to a skin abrasion. He found also that ten-per-cent lactic and one-per-cent acetic acid in the stomach caused no pain. If the general treatment with bismuth, alkalies, bland food is not successful, codeine grain or atropine sulphate $\frac{1}{50}$ by hypodermic may be employed, and a hot-water bag or mustard plaster placed over the stomach region. In some cases it is necessary to stop all feeding for one or two days; this results in inhibition of hypersecretion.

If at any time distention is troublesome, one may take measures to open the bowels. One may apply a hot-water bag, and give sodium bicarbonate thirty grains with spirit of peppermint five minims or other carminative. For a day or so it may be necessary to restrict food, less often and to omit cereal from the diet. If the stomach is atonic it calls for administration of strychnine. If the lesion is entirely colonic, and especially if it is located in the splenic flexure, it may yield quickly to an enema or colon irrigation. If there is tympanites it may require carminative enemata of turpentine or spirit of peppermint, and the application of hot stupor. A rectal tube being left in the rectum for half an hour or so.

Vomiting is unusual, and arouses suspicion of a gastric ulcer. There is the vomiting of intolerance to food. If this does not yield to the regular ulcer treatment, it demands daily lavage, duodenal feeding, or surgery. There is also the vomiting of hyperacidity, perhaps accompanied by hyperperistalsis. This is usually preceded by the nausea accompanying severe hunger contractions, and it yields to the regular treatment. The vomiting of retention requires lavage and usually a milk-free diet.

In some cases in which a course of one week or two of ulcer diet is unsuccessful in abolishing the pain and other symptoms, when the ordinary ulcer treatment is followed by recurrence, a course with duodenal feeding may be successful. This may be tried especially when the patient objects strenuously to surgery.

In duodenal ulcer without obstruction the intermittent character of the attacks may

patient seem to be cured when he is not. Freedom from pain and discomfort obtained by proper treatment does not of necessity mean a cure until time proves it permanent.

CHARACTER AND MANAGEMENT OF GASTRIC MYASTHENIA.

The *Proctologist and Gastroenterologist* for March, 1917, contains an article by Austin in which he expresses the belief that one of the most important factors in the treatment of gastric myasthenia is the character and manner of preparation of the food. While it has been demonstrated that the motility is not impaired, still personal experience soon shows every physician that a large meal causes more or less discomfort, not only during the period of its digestion, but frequently for two or three following days until conditions are restored. This is unquestionably due to the overdistention of the weakened muscular coats, which requires the stated period to be overcome; therefore we are restricted to five small meals instead of the three usual ones to which the American public is accustomed. In no case of gastric disorder is the necessity for slow eating and thorough mastication more evident than in these cases which Austin describes. Rapid eating, undoubtedly, increases the amount of air which enters the stomach and still further aggravates the condition of atonia. Food, too, must be of the most concentrated character, and soups, large quantities of milk, and other liquid must be avoided. The supreme folly in directing such patients to take two or three quarts of milk a day is self-evident. In fact, experimentation has shown that the large meal, by exciting the secretion of a larger quantity of gastric juice, or possibly diluting fluid from the antrum, soon increases the gastric content to assume its normal concentration; hence the great discomfort experienced when these large quantities of fluid are taken points out the dry diet as the most satisfactory to be employed. Therefore, it is most desirable that the patient be urged to refrain utterly from

fluid with the meal and wait at least half an hour before the customary cup of tea, coffee, or cocoa is taken. All effervescent drinks, Vichy, White Rock, and particularly beer, are an abomination under these conditions, since they exaggerate the pathological condition which we are trying to overcome.

The density and viscosity of the gastric contents withdrawn also point to another aid in digestion, and that is the finer comminution of all foods that are taken. If the teeth are impaired, as so frequently happens, artificial means, such as mashing all vegetables and chopping all meats which can be done by the patient with knife and fork, or better still, with the Enterprise meat cutter, are very essential. There is no reason why the ration should not be a well-balanced one, consisting of an appropriate quantity of starch, protein, and fat, though it has appeared to Austin that the fat portion of meat, and especially meat which is inherently fatty, like pork, etc., should be avoided. Those vegetables, too, which contain a large amount of cellulose, such as turnip, celery, cabbage, and cucumber, must be avoided. Fats should be restricted to cream and butter, not too salty, and the employment of sweet oil can be recommended. Fruits are advisable, particularly in their cooked state, but seed and skins are to be rejected. In regard to the use of sweets, there is much variation in their effects on different patients. Lump sugar and chocolate caramels, without the customary ingredients of nuts and figs, have been used by Austin in certain cases to great advantage, while in others complaint is made that they either produce a burning sensation or sometimes increase the eructations.

One thing, however, is most essential, and that is that the patient should receive a diet of full caloric value, since in the majority of cases they are undernourished and increased nutrition is often the most successful form of treatment. This can be accomplished only by specifying the amount as well as the character of the food which should be employed. On account of the constant tendency to constipation, coarse breakfast foods, like wheat grits, wheatena.

and shredded wheat, are desirable, though occasionally patients are found who have to eschew their employment, because of increased discomfort from their use.

As many of these patients suffer from insomnia, it is often desirable to recommend a light meal just before bedtime, which may consist either of a sandwich made with cream cheese or a cup custard, both of which are readily disposed of and do not increase the gastric discomfort.

Tea, coffee, and cocoa, under the restrictions mentioned above, can be employed, but coffee particularly should be taken only with cream, never with sugar, since the consensus of opinion among patients is that coffee produces distress when taken as is customary with both milk and sugar.

Of all green vegetables, finely chopped spinach has seemed to be most desirably adapted to this state of atonia, aiding and facilitating the action of the bowels and apparently not increasing the tendency to eructations. The employment of baths for this condition has proved very efficacious in Austin's hands. We may either use the cold sponge over the abdomen, followed by brisk rubbing, or what is better still, the bath spray, either arranged to deliver cold water alone, which should be directed upon the epigastrium and continued for a period of three to five minutes, or one arranged to deliver cold and hot water, such as can readily be adjusted to the two faucets of the bath tub. In this case, we can either temper the water so that at first it is tepid, and then the temperature may be lowered until cold water alone is delivered at the nozzle; or we may employ the Scottish douche, by which alternately hot and cold water is employed, finishing always with the spray of cold water. Then, again, many individuals, on account of the associated nervous condition, as it is called by them, are benefited by the cold plunge. This can be introduced, first, by filling the bath-tub the evening before and allowing the chill of the water to become partially dissipated, when after being somewhat accustomed to it the patients will readily plunge into the freshly drawn cold water of the tub. The invigor-

ating effect of this bath upon the myasthenic stomach is indicated by the fact that the appetite for the breakfast is improved and very little discomfort is experienced after that meal. In Austin's opinion, this method of treatment should be employed in the early morning, directly after the individual has aroused from sleep. Such baths should never continue beyond a period of five minutes or, if the plunge is employed, should be almost instantaneous, and then the patient should be wrapped in a blanket bathrobe until the reaction occurs, which always follows promptly in all but the extremely anemic.

EFFECTS OF TONSIL OPERATION IN SINGERS—AN ANALYSIS OF 5000 CASES.

The *New York State Journal of Medicine* for March, 1917, contains an article by VOORHEES bearing this title. He thinks there is no doubt that in certain selected cases it is better to temporize than to resort to radical operation. Special consideration which cannot be entered into at length should afford the basis of such judgment. It is occasionally better to do a tonsillectomy and treat the cryptic stumps by introducing a bead of chromic acid or the electrocautery point. This especially in the very large tonsil, which holds the two pillars in an apparent state of tension. The swollen cheesy tonsil should be removed *en masse* as nothing is to be gained by simply plunging with it. The sooner it is out the better. In conclusion:

1. An analysis of 5000 tonsil operations in singers shows that in the hands of skilled operators there need be no special fear of bad results.
2. It is the consensus of opinion that the bad results are most often due to cicatricial adhesions occurring from careless dissection or from neglected after-treatment.
3. Pain in the tonsillar region, neck stiffness, and larynx is probably due to section of some of the larger branches of the glossopharyngeal nerve (Justus Matthews).
4. Loss of singing voice occurs

after tonsillectomy, if at all. Improvement is possible, but most cases show increased range of from one-half to a tone.

Loss of singing voice after tonsillectomy might be due to a nerve lesion, but is usually due to adhesions and cicatricial contractions in the fauces.

The singer's problem is a very special one and no laryngologist should undertake operation on these patients unless he has knowledge of the art of singing.

At operation the greatest care and skill must be exercised in securing a clean, free incision. Injury to the tissues surrounding the tonsils may prove disastrous.

Postoperative care is of special importance. The patient should be seen daily until healing ensues.

ZINC CHLORIDE IN UTERINE HEMORRHAGE.

Journal of the American Medical Association of March 17, 1917, contains an article by BOLDT in which he says that it is too radical, in his opinion, to subject a patient who has a very profuse bleeding, in the form either of menorrhagia or metrorrhagia, the uterus not being the seat of a neoplasm, to an extirpation of the organ. He, therefore, commenced to experiment with varying strengths of phenol applied within the uterus. In mild cases sometimes gave a good result. Then he began to make his applications of longer duration by leaving in a gauze strip—a tampon saturated with the medicament in that part of the gauze which was to remain in contact with the corporal endometrium. This was done by wrapping an intra-uterine applicator syringe, such as is made according to Boldt's directions by the Kny-Scheerer Company and Tiemann & Company. The applicator is drawn into the small barrel of the syringe, and this is wrapped with a narrow strip of gauze. The cannula of the applicator is made of silver, from 4 to 5 inches long with only a terminal opening, so that the medicament comes into contact with the endometrium from the fundus downward.

To allow of the gauze being readily slipped off, the cannula should be smeared with petrolatum before the wrapping. The strip should be from 1 to 2 inches wide, and the length should vary with the size of the uterine cavity, usually from 12 to 24 inches. When the gauze-wrapped cannula has been introduced into the uterine cavity, a small quantity of the medicament, 4 or 5 drops (if zinc chloride), is expelled into the gauze. Then the cannula is withdrawn slightly and, being used as a uterine packer, more gauze is put into the uterine cavity and more of the medicament is ejected. This process is continued until the desired quantity has been ejected into the gauze and the cavity packed properly. When enough medicament has been put into the gauze, the cannula may be entirely withdrawn and the remaining part of the gauze packed into the uterine cavity with an ordinary smooth uterine applicator. It is essential that none of the medicament should come in contact with the cervical mucosa, especially if zinc chloride is used, lest a stricture result. The remaining part of the non-medicated gauze strip is then used to pack tightly the cervical canal. It is frequently necessary to dilate the cervical canal with a cervical dilator to assure a ready packing with the gauze.

A string should be attached to the terminal part of the gauze strip to enable the patient to remove it herself at the time designated for its removal. A fairly large absorbent cotton tampon is placed in the vagina after insertion of the gauze. The time of removal of the intra-uterine tampon depends on whether zinc chloride or phenol has been used. If phenol, either pure or diluted with glycerin, is the medicament, the gauze strip may be removed after the lapse of a few hours. But if zinc chloride, the time to elapse must be long enough to give it an opportunity to exert its action on the interior of the uterus, which is about three days. In case of severe abdominal pain, which may occasionally occur, one-fourth grain of morphine is sufficient to give relief. It is very important, to insure proper action of the medicament, that the interior of the

uterus is practically dry; that is, that no bleeding from it occurs when the application is made. When there is blood oozing, the packing of the cavity with styptic gauze for a variable time is the best method to overcome it.

Unless permanent amenorrhea is desired, not more than from 5 to 10 drops of the strong solution (50 per cent), or a somewhat larger quantity of a 10- to 20-per-cent solution, should be used.

It has been found that one application of zinc chloride, if properly made, once in four weeks, usually suffices. This is to be repeated, at such intervals, until the wished-for result has been brought about. From four to twelve applications generally suffice. With twelve applications, or even a less number, it has been found possible to effect complete amenorrhea in very profuse bleeding from interstitial myomas. Some of these tumors, in Boldt's experience, were fully 6 inches in diameter. While they did not decrease in size, the symptoms disappeared and the patients improved in health. Since the bleeding stopped, this was logical.

Zinc chloride is made use of when the uterine bleeding is very profuse from a chronic inflammatory condition of the endometrium, whether the myometrium is involved or not. If the bleeding is not too profuse or too prolonged, phenol suffices to bring about relief. Zinc chloride is always used in instances of profuse bleeding when interstitial myomas of small size cause it. In large tumors of this character Boldt has not used it, nor would he advise its use, because, in such cases, he feels that it is more to the interest of the patient, if one does not wish to use radium or roentgenotherapy, to remove the tumor. By the latter statement he does not wish to be understood as favoring roentgenotherapy in these conditions, since he himself has seen instances of cancer complicating the tumor.

It is understood, of course, that one should always be sure, before using this treatment, that the bleeding is not caused by a malignant change of the endometrium.

This is a form of treatment which may be used in his office by an intelligent physi-

cian who understands gynecologic nosis; even the sometimes necessary dilatation, to introduce the gauze-wr. cannula, may be done. Seldom has found it necessary to do this, under oxygen anesthesia, in a hospital.

RECIPES FOR KILLING FLIES

The *Pennsylvania Medical Journal*, May, 1917, states that the United States government makes the following suggestion for the destruction of house-flies: Formaldehyde and sodium salicylate are the best fly poisons. Both are superior to arsenic. They have their advantages for household use. They are not a poison to children, they are convenient to handle, their dilutions are simple, and they kill the flies.

A formaldehyde solution of approximately the correct strength may be obtained by adding 3 teaspoonfuls of the commercial formaldehyde solution to a pint of water. Similarly, the proper concentration of sodium salicylate may be obtained by dissolving 3 teaspoonfuls of the pure chemical (a powder) to a pint of water.

An ordinary, thin-walled drinking glass is filled or partially filled with the solution. A saucer, or small plate, in which is placed a piece of white blotting-paper cut to the size of the dish, is put bottom up over the mouth of the glass. The whole is then quickly inverted, and the blotting-paper is placed under the edge of the glass, and the container is ready for use. As the solution dries out of the saucer and the liquid at the edge of the glass is broken, the liquid flows into the lower receptacle. The paper is always kept moist.

Any odor pleasing to man is offensive to the fly, and *vice versa*, and will drive them away.

Take five cents' worth of oil of lavender, mix it with the same quantity of water, and spray it in a common glass atomizer, and spray around the room where flies are. In the dining-room spray it lavishly even on the table linen. The odor is very disagreeable to flies and refreshing to most people.

Geranium, mignonette, heliotrope,

clover are offensive to flies. They usually dislike the odor of honeysuckle and pop blossoms.

According to a French scientist flies have a hatred for the color blue. Rooms painted in blue will help to keep out the

together one tablespoonful of cream, of ground black pepper, and one of sugar. This mixture is poisonous. Put in a saucer, darken the room and close one window, and in that set the

clear the house of flies, burn pyrethrum powder. This stupefies the flies, but must be swept up and burned.

TRANSFUSION OF BLOOD.

The *Bulletin of the Johns Hopkins Hospital* for March, 1917, McCLURE and others remind us that transfusion has been used in the following conditions: pernicious anemia, illuminating-gas poisoning, exophthalmic goitre, hemophilia, toxemia, shock, hemorrhage, leukemia, septicemia, purpura hemorrhagica, malnutrition, endocarditis, anemia, general debility, dysentery, malaria, fever, infectious diseases, melena, hemorrhum, scarlet fever, pellagra, tuberculosis, and tumors. It has also been used for vaccinating purposes.

The best results have been obtained in hemorrhoids and babies with melena neonatorum; in the latter it is a specific, and in the former it stops the bleeding immediately, though without curing the disease. It is of great benefit in all anemias, and with proper regulation may be of still more benefit in the primary types. Thus far in transfusion it has been disappointing. This may well be due to the fact that the shock has progressed too far before the transfusion has been done. They would advise early transfusion in cases of shock. Following acute and prolonged hemorrhage transfusion is of the greatest benefit. In cases of poisoning, bleeding is beneficial, as pointed out by Halsted. Depletion by injections of saline solution is about as good as if not better than transfusion.

In tuberculosis there has been only slight benefit, and so far nothing has been accomplished by transfusion in malignant diseases in man.

TREATMENT OF PAIN AND DISTRESS IN DIGESTIVE DISORDERS.

In the *Boston Medical and Surgical Journal* of March 8, 1917, AUSTIN tells us that the treatment of cardiospasm naturally divides itself into two parts. The first, when functional, is prevention, which comprises the following suggestions: The patient must avoid rapid eating and particularly drinking, because of the great risk of causing an attack when much air is introduced into the stomach. An excellent plan to follow in taking fluids has been found to be the use of a tablespoon, by which necessarily only a small portion enters the esophagus at one time. Many suggestions can be offered also with the purport to stop the wolfing or bolting of food; laying down the knife and fork after every mouthful will tend to check this haste and cause better mastication, while a watch laid before the individual will soon convince him of the rapidity with which he is devouring his food. No iced drinks nor foods should be taken, since these, too, tend to bring on an attack of the spasmodic closure of the cardia. All efforts to overcome the spasm by eructations must be avoided, since usually more air is introduced into the esophagus than escapes. Constipation must be controlled, as apparently, by reflex activity, it predisposes toward such spasm. Smoking and aerated drinks are also known to encourage these attacks and consequently must be given up.

During an acute attack the suffering varies from mild pain, which the patient usually localizes in the precordial area and considers due to a heart attack, sometimes termed pseudo-angina, to a most incessant suffering, reminding one often of an attack of gall-stone colic. For the severer attacks nothing works with the rapidity and efficacy of the hypodermic injection of morphine, since our only object is to relax the spasm.

Less severe attacks can usually be overcome by means of the carminatives, such as a half teaspoonful of equal parts of spirit of chloroform and compound tincture of cardamom, or the latter with aromatic spirit of ammonia, given in hot water, either sipped or taken with a tablespoon. The old and well-established remedy, Jamaica ginger, taken in hot water, will usually relax the milder forms of spasm. Where the patient's pocketbook permits, validol or menthyl valerianate serves the purpose admirably.

On the contrary, when this spasm is the outcome of an ulcer situated at or near the cardia, the patient should be subjected to a regular ulcer diet, as originated by Lenhartz and modified by as many practitioners as have ever used it. Where the attacks are of functional character, the choice of food has seemed to Austin of very little importance, provided the suggestions made above are followed; but when actually due to ulcer, a most rigid selection of bland, non-irritating food must be made to check possible irritation.

The management of distress after food is taken, usually arising from myasthenia, is one of the most trying problems presented to the physician. As this apparently arises from any distention of the stomach, our object is to provide the patient with sufficient nourishment and to render his discomfort during the period of its digestion as little as possible. To do this, we must advise small, frequent meals with little or no fluid; hence soups and large quantities of milk are absolutely inadvisable, and the food should always be taken dry. Fluids may be taken, of course, but in the intervals between meals so as to avoid overdistention. Moreover, the more finely divided the food may be, the more readily it leaves the stomach and the less the period of discomfort. Fats, too, are known to delay the motility of the stomach or, at least, leave it very slowly, so that, outside of cream and butter, they should be eliminated from the dietary. Patients, too, from their personal sensations, declare that meat causes them much more discomfort than any other form of food, and the more extensive employment of eggs,

soft cheese, and gelatin to supply the tein deficit should be advised. Our effort should be directed to lessen the discomfort as much as possible and to increase gastric motility. The former can be accomplished frequently by the use of bromine, which may be employed in gramme after the food is taken, or in the employment of anesthesin, which, while not so efficiently active to delay acute pain, will relieve very much the patient's discomfort when taken in doses of 0.3 gramme before the meal. Anesthesin is also prepared in the form of bonbons, which make a very desirable vehicle for its use.

Pyloric spasm with late post-cessation early morning pain can be alleviated or controlled both by dietetic and medicinal means. The former consists largely of the total avoidance of coffee or condiments, as well as alcohol on an empty stomach. In this condition is frequently accompanied by hypersecretion and possibly caused by hypersecretion, though the evidence of the latter is not positive, we should also advise patients to have in their possession some of the heavy alkalies, like bismuth or magnesia. The former to be employed if there is a tendency to diarrhea, and the latter if the patient is prone to constipation. These substances are rather disagreeable to take, and from Austin's own experience the preparations known respectively as "milk of bismuth" and "milk of magnesia" are the most palatable and readily taken. Their only advantage is that the amount of material in suspension is small, not exceeding 10 grains per teaspoonful.

The oils also prove efficacious when taken during the attack or sometimes before the meal, and sweet oil furnishes, perhaps the most satisfactory of these, though 10 grains of petrolatum in tablespoonful doses is also effective in checking the spasm as well as having a mild laxative action. Usually, however, we are compelled to resort to certain drugs to overcome this spasmic action or "cramp" as the patients term it, and nothing better has been found than atropine sulphate in 1 mgm. doses three or four times a day, taken after the food.

of the unfortunate susceptibility of individuals to this medicament, by which the throat becomes dry and the pupils dilated, interfering with the vision, one must inform the patient of these peculiarities or else much alarm is aroused. To overcome this we may employ methyl atropine or eumydrin, its trade name, in doses slightly larger than those of atropine, but never exceeding 2 mgm., three times a day.

CASES OF PELLAGRA TREATED IN 1916.

RAINES in the *Memphis Medical Monthly* for February 1, 1917, again insists upon a diagnosis before skin symptoms appear. He states that if we hope for the best results we should not wait for a positive diagnosis, but begin treatment if there is a reasonable doubt in favor of the patient having pellagra.

He has seen a number of cases in his immediate neighborhood this year in which the opportune time for treatment was lost. One case was a woman who was moribund when first seen. The woman had been treated for tuberculosis. Valuable time had been lost and she died within five days.

He considers a patient "cured" when there are no manifestations of pellagra, the dyspepsia, indigestion and sore mouth having disappeared, with no appearance of skin lesions, and, he might add, when the patient is able to go about his usual avocation and strong enough to perform manual labor.

Emetine is given in all cases in which the dyspepsia is persistent, and particularly if there is blood in the passages. The emetine hydrochloride is given in one-grain doses every other day or until the abnormal discharges cease. Frequently one dose is sufficient to stop the diarrhea.

In one case of amebic dysentery was treated, in which the man said he "had suffered many things from many doctors" for many years. He has gained thirty pounds in weight and has not lost a day from work. Raines "treats the patient, not the disease" and gives him whatever he needs

when he needs it. For the insomnia veronal is preferred; for the restlessness, nervousness, and despondency the elixir of five bromides is given, combined with chloral hydrate when needed.

It is claimed that the best results are obtained early in the disease when large doses are given, whereas small doses are to be preferred in advanced cases. He rarely gets the cases to treat until they have had the disease several months, consequently he is afraid to administer large doses in the beginning.

One man was given a $7\frac{3}{4}$ -grain dose, and before Raines could replace his syringe he fell on the bed. He was pulseless, his breathing laborious, and Raines had to get busy to keep from recording another death from pellagra.

Another case, that of a vigorous young woman, was given a $7\frac{3}{4}$ -grain dose at Raines's office. In less than one minute another patient called to him from the reception room, saying, "Come in here quick; this woman has fallen over on the sofa and is bleeding from the nose."

Raines does not claim that cacodylate of soda is a true specific for pellagra, but after four years' experience with the drug he can say that it has far exceeded his expectations.

He has had no experience with salvarsan and very little with atoxyl in the medical treatment of pellagra, preferring to "bear the ills we have than fly to others we know not of." Besides, the cost would make such treatment prohibitive in general practice, where the financial condition of the patient must be considered.

He gives a good, liberal diet—in fact, all the patient's digestion will stand. He prohibits fat meat, corn bread, and much sweets. He sees no reason for prohibiting a moderate use of sweets, particularly if they do not upset the stomach and bowels. If good meal is procurable he sees no reason why the well should not eat it as a prophylactic and the sick because they want it. By good meal he means sound corn, the ears "nubbed" at both ends, and ground on a slow mill.

THE THERAPEUTIC ADMINISTRATION OF OXYGEN.

The *British Medical Journal* of February 10, 1917, contains an article by HALDANE in which he thoroughly discusses this topic and emphasizes the fact that a physician ought to make every effort to avert the effects of want of oxygen or cut them short. It may be argued that such measures as the administration of oxygen are at the best only palliative and are of no real use, since they do not remove the cause of the pathological condition. As a physiologist, he cannot for a moment agree with this reasoning. The living body is no machine, but an organism constantly tending to maintain or revert to the normal, and the respite afforded by such measures as the temporary administration of oxygen is not wasted, but utilized for recuperation.

Let us now consider in more detail how oxygen want is produced, what seems to be possible in directly combating it by oxygen administration, and what risks have to be avoided. We may begin with a simple and easily intelligible case—that of poisoning by CO, or by a nitrate, chlorate, or other poison which causes death by disabling the oxygen-carrying power of the blood. In such a case acute want of oxygen is produced by the poison disabling the hemoglobin, so that it is unable for the time to carry sufficient oxygen to support life. Normal human arterial blood carries about 18.1 Cc. of available oxygen per 100 Cc. of blood. Of this, about 17.75 Cc. are combined with the hemoglobin and 0.35 Cc. is in simple solution. In passing round the circulation during rest this blood loses only about 4.5 Cc. of oxygen. In poisoning by CO and similar respiratory poisons, death occurs when about 80 per cent of the hemoglobin is disabled. If the patient is still alive there will, therefore, still be 20 per cent of his hemoglobin available. But by administering pure oxygen we can at once increase the amount of oxygen in simple solution to about 2.5 Cc. This promptly averts any further danger from want of oxygen, and in CO poisoning the oxygen rapidly drives out CO from the

hemoglobin, so that after fifteen or two minutes of continuous administration oxygen may be discontinued. In poisoning by nitrites, etc., there is also a fairly rapid return of the blood towards the normal consequent on the gradual elimination and destruction of the poison. Experiments on animals have shown quite clearly that oxygen actually does avert death in the cases just considered.

In acute inflammatory conditions of the lungs there is sometimes also want of oxygen, as shown by cyanosis; and when the inflammatory condition is accompanied by the presence of "edematous" exudate throughout the lungs the cyanosis is of a very great. This condition is seen typically in the acute stages of poisoning by nitric fumes or chlorine. What is its probable cause? When a portion of the lungs, including even the greater part of both lungs, is entirely blocked by consolidation, as in croupous pneumonia, there is commonly cyanosis. This indicates that very little blood is passing through the consolidated parts. What passes through the healthy portion is amply sufficient for respiratory requirements during rest. It must be borne in mind that the normal lungs and circulatory organs are adapted for meeting about ten times the respiratory requirements during rest, since the respiratory change is often about ten times as great during work as during rest. Hence during rest in bed a very small proportion of normal lung will suffice for meeting respiratory and circulatory requirements, provided there is but little circulation through parts which are useless. But when cyanosis due to a lung affection exists, in spite of the fact that air is entering the whole or great part of the lungs, freely, we are driven to the conclusion that the entry of oxygen into the blood through the alveolar walls is impeded by exudation and increase in thickness of the alveolar walls.

It is very important to realize that cyanosis may occur without any serious impediment to the passage of the CO₂ outwards. CO₂ is about twenty-five times as soluble in water as oxygen, and hence it passes

through the alveolar walls far more easily, with a given difference of partial pressure, than does oxygen. Moreover, a comparatively slight increase in the breathing will enormously increase the small difference in diffusion pressure on which the passage of CO_2 outward depends; but the same increase in breathing produces only a slight proportional increase in the diffusion on pressure which drives oxygen inward. Hence we may have cyanosis, and consequently very formidable effects from oxygen want, without marked hyperpnea. The gray look of the patient's face will be a good index of this. There will probably be no increase of venous blood-pressure with its accompanying full blue cyanosis.

If great hyperpnea accompanies the cyanosis there must be some other complicating condition. This accompaniment is seen typically in the acute stage of poisoning by chlorine or nitrous fumes; and the results of post-mortem together with clinical observation during the recovery stage seem to reveal the cause. In the acute stage the alveolar walls become extensively torn in efforts to breathe despite the blocking of many of the bronchi by exudation or constriction. In consequence of this there is wide-spread emphysema, which is very evident on post-mortem examination. The areas round the emphysematous cavities are partially collapsed and very imperfectly ventilated, so that the CO_2 percentage rises in them to an abnormal extent. The emphysematous cavities are excessively ventilated, but this ventilation is of little use since the proportion of sound alveolar wall to air is far too small. In consequence of this the CO_2 content of the arterial blood is raised, and hyperpnea, along with increased arterial and venous blood-pressure, results. As the edema clears up the cyanosis disappears, but hyperpnea remains for some days, since it takes a considerable time for the emphysema to heal up.

When there is cyanosis (whether of the deep purple or gray type) due to hindered passage of oxygen through the alveolar walls, this can be combated by raising the percentage of oxygen in the alveolar air

and so increasing the diffusion pressure. The normal alveolar oxygen percentage is about 14, or 7 per cent less than in the external air. By raising the percentage of oxygen in the inspired air to 35 we raise the alveolar oxygen percentage to 28, and thus much more than double the effective diffusion present, since the oxygen pressure in the venous blood passing to the lungs will probably be at least 4 per cent. It will probably, therefore, require only a moderate increase in the oxygen percentage of the inspired air to remove the cyanosis. Even in ordinary cases of croupous pneumonia the alveolar oxygen pressure may be a matter of decisive importance. This is clearly shown by the fact that these pneumonias do very badly at high altitudes. At Cripple Creek (altitude about 10,000 feet), in the Rocky Mountains, Haldane found that this was so well recognized that all cases of pneumonia were put in the train and sent down to the prairie level.

Where, in lung affections, an addition of oxygen to the inspired air is needed in order to combat want of oxygen, it is evidently desirable to continue the administration over long periods. It was shown by Paul Bert that oxygen at a pressure of about three atmospheres is capable of producing convulsions and rapid death; but Lorrain Smith found that, apart altogether from this action on the nervous system, pure oxygen at high pressure produces pneumonia pretty rapidly, and even at ordinary atmospheric pressure acts slowly on the lungs, ultimately producing fatal pneumonia after several days in animals. This effect was even occasionally produced in about four days by a mixture containing only 80 per cent of oxygen. It is evidently desirable, therefore, to keep the oxygen percentage as low as possible during long administrations, and to know roughly what percentage is being breathed.

In cases in which the source of danger is failure of the circulation, the inhalation of oxygen may also be of use, and Haldane has seen the cyanosis in a case of valvular disease clear up at once on the administration of oxygen. The effect was so striking

that it could hardly be attributed to the increased amount of oxygen going into simple physical solution in the arterial blood. It seemed more probable that owing to back pressure in the lungs and consequent exudation, etc., there was hindrance to the diffusion of oxygen inward, and that with the increased oxygen percentage this was overcome. Nothing but practical trial, for which he has at present few opportunities, will show to what extent, and under what conditions, the administration of oxygen is of use in various pulmonary and cardiac affections. Cyanosis may always be taken as an indication that oxygen inhalation should be considered.

The immediate effect of suddenly giving an abundance of oxygen to a cyanosed person may sometimes be unpleasant, as he well knows from experiments on himself and others. The heart may become tumultuous in its action, and the breathing irregular for the time, or the patient may wake up to the realization of pain or discomfort. His respiratory center may also wake up to reaction against accumulated CO_2 . It is well, therefore, not to add oxygen too rapidly to the inspired air in cases of cyanosis.

Existing methods of giving oxygen are nearly always very crude and wasteful of oxygen, and it is not possible to graduate efficiently the percentage of oxygen administered. The simple apparatus now to be described is designed to remedy these defects and render practically possible the prolonged administration of air enriched with as little oxygen as will suffice for the purpose aimed at.

An ordinary 20-foot oxygen cylinder is fitted with a pressure gauge and adjustable governor of the type employed in mine-rescue apparatus. By means of the governor the delivery of oxygen can be varied at will from nothing to 10 liters a minute. The oxygen is delivered into a small bag of thin vulcanized rubber of about 2 liters capacity. From this bag there passes to a face-piece on the patient a flexible tube of about five-eighths of an inch in diameter. At its origin from the bag this tube is pro-

vided with a non-return mica valve. The last part of this tube is of light and perfectly flexible corrugated rubber tubing of the kind introduced by Mr. Fleuss in the mine-rescue apparatus. The face-piece is of the ordinary type, fitting over the mouth and nose, but so designed as to leave a minimum of dead space when applied to the face. It can be secured in position by an elastic strap. Besides an inlet for oxygen, the face-piece has inlet and outlet valves for air, so that if no oxygen is turned on the patient can breathe the air comfortably and freely. Some air will always leak in and out round the face-piece, which need not be at all tightly applied.

When oxygen is turned on it accumulates in the small bag during expiration, since the very slight expiratory pressure in the face-piece closes the non-return valve, and this prevents the issue of oxygen from the bag, and, of course, at the same time prevents expired air from entering the bag. During inspiration the bag is emptied, the oxygen passed into the face-piece and thence into the patient's lungs. If only a little oxygen is turned on the patient will be breathing mostly air, but by turning on more oxygen the proportion of oxygen can be increased till nothing but pure oxygen is being inspired, and the bag does not completely collapse till the very end of inspiration. Thus no oxygen is wasted, and an enormous economy of oxygen results so that prolonged administration of oxygen becomes practicable.

Where prolonged administration of oxygen seems desirable, the minimum quantity of oxygen which will remove the cyanosis should be carefully ascertained by observation of the patient, and the governor adjusted to give this minimum quantity which is likely to be anything from 1 to 10 liters per minute. The quantity needed will of course depend on the weight and age of the patient; and if hyperpnea due to CO_2 is present, a larger quantity will be needed to reach a given percentage. A man at rest usually breathes about 7 liters of air a minute.

The probable risks of prolonged admini-

tion of pure oxygen must be borne in mind, and if necessary balanced against the risk of allowing the oxygen want to continue. No fixed rule can be given. The proper course to pursue must be determined by the physician after careful observation of the patient and in the light of experience and knowledge. Many points with regard to the utility of oxygen administration are obscure, owing to the haphazard methods hitherto used in the administration of oxygen.

COAGULATION OF COW'S MILK IN THE HUMAN STOMACH.

In the *Archives of Pediatrics* for February, 1917, BRENNEMANN reaches these conclusions as the result of a research:

Cow's milk coagulates in the human stomach within a few minutes. The small curds formed at first increase in size, for at two hours, by coalescing with their neighbors, after which they decrease because of the peripheral digestive action of gastric juice, but are still present after 24 hours.

The curds of raw milk are very large and hard, and those of boiled milk small and soft; those of pasteurized milk between the two, but almost like those of raw milk; and raw milk is a very solid food—boiled milk a semiliquid food.

The less the fat in the milk the harder the curd; the more the fat, the softer and flatter the curd.

The greater the amount of fat the longer the stay in the stomach, and the slower the digestion.

Milk taken very slowly forms a larger curd than when taken rapidly.

The greater the dilution with water the finer, flakier, and more porous the curd.

Alkalies and sodium salts very greatly retard coagulation—even stop it completely if in sufficient amounts.

Precoagulated milk, such as butter-milk, pegin milk, or eiweissmilch, shows but a little tendency to re-coagulation.

Dried and condensed milks, as a rule, form a minimum curd.

Starchy decoctions, such as barley-

water, have a very decided influence in lessening the size of the curd, much more so than simple watery dilution.

11. Soluble carbohydrates, such as dextrans and sugars (milk, cane, and malt) have apparently no appreciable influence on the curd.

THE PLACENTA AS A GALACTAGOGUE.

In the *Gazzetta Italiana delle Levatrici* for July, 1916, TERESA BIANCHINI reports five cases of placentophagy which came under her notice in the Italian marches. The afterbirth was taken to increase the secretion of milk, which in all the women had failed without obvious cause after previous confinements. The placenta was cut up and washed, cooked in salt water, except in one case, in which broth was used for the purpose, and eaten mostly in large pieces. Except for the cooking the method of administration was practically that naturally followed by some animals—for instance, the bitch, which swallows its own afterbirth immediately after expulsion. The treatment is said to have been successful after other methods of stimulating the milk secretion had failed. The placenta was used in antiquity and in the middle ages as a remedy in difficult labor, and in our own day the human afterbirth and that of the sow has been used in extracts given in pills and other vehicles to stimulate the mammary function. In all parts of the world there are many places where the women still hold by the old tradition. In Morocco it is believed that eating the placenta prevents barrenness and hastens delivery. Preparations of the placenta hold a considerable place in Chinese therapeutics. It is regarded as the best remedy for chlorosis and is useful in cases of anemia following parturition. It is thought to be most efficacious when taken fresh, but it is also given dried and in pills. Madame Louise Toussaint, a French midwife, quoted by Cabanés in his *Remèdes d'autrefois* (Paris, 1905), speaking of women in labor, says: "Notwithstanding the disgusted protests which will come to the lips of many of you, O accoucheurs and midwives, in reading

me, give them, believe me, some fragments of their own placenta and you will tell me what happens. You will see how much you will in this way promote rapid recovery and with what abundance and rapidity the milk will come on. Do not forget that even in non-pregnant women and in virgins the milk secretion may be made to appear by simple placenta feeding." The same woman observer affirms, from her own experience, that there is nothing like the injection of sheep's placenta, dried and then triturated with powdered sugar, for making the milk come abundantly in women who had none, and also for doubling the daily output in nurses. Cabanés tells us that at the fourth French Congress of Internal Medicine, held at Montpellier in April, 1898, Dr. Iscovesco presented a communication on the therapeutic action of the placenta illustrated by more than a hundred cases. He used sheep's placenta in tablets, each representing 0.25 gramme of the fresh substance; the daily dose never exceeded 1.50 grammes. This seemed to have a favorable effect on the secretion of milk. The treatment was also said to have brought about remarkable improvement in chronic metritis with hypertrophy of the uterus and concomitant catarrh even when the appendages were diseased, and in cases of abnormal involution of the womb after delivery.—*British Medical Journal*, Feb. 10, 1917.

THE TREATMENT OF MALARIA AND MALARIAL COMA BY INTRAVEN- OUS INJECTION OF QUININE URETHANE.

RICHET and GRIFFIN in the *British Medical Journal* of February 10, 1917, say that the cases of malaria that reached their hospital from Salonica were of a severe type; in all anemia, loss of weight, and exhaustion were marked; there were rigors in which the temperature reached 107.8°. Most of the men had received numerous intramuscular injections of quinine, some as many as ten or twelve, and all had been treated with quinine by the mouth. In the severe cases quinine by the mouth and

intramuscularly had little effect in controlling the fever or the recurrence of rigors.

The type of cases in which the patient passed into a state of coma in twenty-four hours was new to most of them. The men were usually markedly anemic and wasted but the temperature rarely exceeded 102°. Quite suddenly the patient would complain that he had difficulty in swallowing, rapidly followed by inability to speak, loss of power in the limbs, coma, and incontinence of urine and feces. The pupils were dilated, reacting sluggishly to light, pulse feeble and quick, and respiration resembled the Cheyne-Stokes characteristic. The spleen was enlarged and tender, knee-jerks diminished, Babinski's sign was absent, and there was no ankle clonus. Examination of the blood showed the presence of numerous gametocytes and schizontes.

These symptoms all came on within twenty-four hours, and it was for this type of case that intravenous injection of quinine urethane was first tried.

The injection was made with a fine needle mounted on an ordinary serum syringe of 15-Cc. capacity, and the solution was made up as follows:

Chlorhydrate of quinine, 0.40;
Urethane, 0.20;
Distilled water, 1 Cc.

To this solution in the syringe was added 14 Cc. of physiological serum well warmed. The skin was sterilized with tincture of iodine and alcohol and a bandage applied above the elbow to render the veins more prominent. When the needle enters the vein blood will flow back into the syringe and this sign will prevent the solution being injected into the tissues. Remove the bandage and inject the solution very slowly. Conscious patients notice a bitter taste in the mouth, buzzing in the ears, and slight giddiness within a minute.

The results in cases of coma were remarkable. In five hours the patient became more conscious, and in periods varying from twelve to twenty-four hours he had recovered completely and all symptoms had disappeared.

For some cases one injection was sufficient, and for weeks after there was no further rise of temperature; other cases were given a second injection within twelve hours if the return to consciousness appeared slow.

In no case had the injection any ill effect; only one patient in a series of seventy cases had slight thrombosis of a vein for a few days. Within twelve hours of the injection Lieutenant Richet found evidence of disintegration in the gametes and schizontes, and it was difficult to find any after forty-eight hours.

Two cases of coma only proved fatal, both complicated by dysentery. Each case had two attacks of coma, recovering from the first after intravenous treatment, but relapsing three days later into a second, from which no effort could restore them. Intravenous injections of serum and adrenalin, oxygen by the mouth and subcutaneously, proved of no value. All cases had been treated with quinine by the mouth and intramuscularly over long periods at Salonica, and Richet and Griffin continued to give them fifteen grains daily by the mouth after intravenous injections. An attempt was made to treat all cases of malaria with continued high temperature and constant rigors with intravenous injections of quinine urethane, and the results were more than satisfactory. Practically every case yielded to this treatment, and the rapid improvement in the physical condition of the men was most marked.

Sometimes it was necessary to give two or three injections before the temperature remained normal and the gametes disappeared from the blood, and every endeavor was made to give the injection six hours before the rigor was expected, according to the type of malaria from which the patient suffered. In Salonica as much as 18 grains of quinine were injected at one dose, but Richet and Griffin never found it necessary to give more than 6 to 10 grains in one injection.

Several cases of pleurisy with effusion, but without any fever, occurred in malarial patients, and the fluid rapidly absorbed

after intravenous injections. For the anemia arsenic was given by the mouth or sodium cacodylate injected hypodermically.

Many men arrived at the hospital with the chronic form of malaria which had well-marked symptoms. Chronic headache, often diarrhea and sickness, anemia, lassitude, with an evening rise of temperature to 100°, occurred in nearly all these patients, and the symptoms rapidly yielded to intravenous treatment.

The conclusion arrived at was that intravenous injection of quinine urethane was the only treatment of malarial coma and a valuable remedy for persistent fever and chronic forms of malaria; it was also painless.

Intramuscular injection of quinine was painful, and often cases arrived with indurated lumps in the buttocks from the effect of injection which later broke down into abscesses.

SMALLPOX VACCINATION BY PUNCTURE.

In the *British Medical Journal* of February 10, 1917, HILL says he believes that the best method of vaccination when many are to be vaccinated is as follows:

1. The sleeve is rolled up.
2. Orderly 1 washes the arm with soap and water.
3. Orderly 2 washes the arm with rectified spirits.
4. Orderly 3 washes the arm with ether.
5. Orderly 4 breaks the capillary tube of glycerinized vaccine and sets the rubber bulb or other method of expelling contents, handing it to Orderly 5.
6. Orderly 5 expels the vaccine at three (or four) points on the arm, making a triangle (or square) having not less than 2 inches between the points.
7. Orderly 6 sterilizes an ordinary sewing needle and hands it to the medical officer.
8. The medical officer punctures the arm through the drops of vaccine. Six tiny punctures, drawing no blood, are made through each drop, each set of six occupy-

ing a space of not more than $1/6$ inch square. The needle is held almost parallel with the surface. Not over one-thousandth of an inch enters the epithelial layer. A peculiar little "snick" is felt as the needle point goes in.

9. Orderly 7 wipes off the vaccine.

10. The sleeve is pulled down.

(a) The total time from pulling up the sleeve to pulling it down again need not exceed one minute.

(b) After the orderlies have had a little practice three men per minute can be vaccinated without haste or carelessness.

(c) No after-treatment whatever is required; none should be used; the only direction to the men is leave it alone.

The results are:

I. In those not previously successfully vaccinated (and who have not had smallpox) nothing is found for several days; then develops a typical vaccinal lesion, consisting of one, two, three, or four firm pustules corresponding with the areas punctured. If left alone, without bandage or shield, etc., these remain firm and whole; then dry down into hard "buttons," which finally detach themselves, leaving a cleaned healed base, constituting a typical vaccine scar. If bandages, shields, etc., are used, the moisture from the perspiration, etc., thus retained, macerates the otherwise firm wall of the pustule, which then breaks, thus creating an ulcer open to infection.

II. In those who have been previously successfully vaccinated (or who have had smallpox), a raised red papule develops in a few hours; itches a little, sometimes develops a number of tiny vesicles over its surface, then dies down and disappears. This is the anaphylactic or accelerated reaction, indicating that immunity exists, sufficient to prevent typical vaccinal lesions.

III. Occasionally a mild reaction of this kind, instead of disappearing, develops into a typical vaccine lesion, the anaphylactic papules developing into ordinary vaccine pustules instead of receding and drying up. These pustules then run the ordinary course described under II. Evidently here the immunity from the previous vaccination,

while sufficient to give anaphylaxis, was not complete enough for protection.

IV. Very occasionally no reaction of any kind follows the puncture. Only in a few cases need revaccination be done. The probable explanation in the few cases observed was improper technique or old vaccine.

(a) Certain rare cases showed the anaphylactic reaction (II), although, according to the history given, they never had been successfully vaccinated and never had smallpox. They showed historical "chicken-pox," however. Hill investigated two of these cases, communicating with the mother of each and securing from her a detailed account of the alleged attack of "chicken-pox." In one case it was evident from the mother's description that the attack was really smallpox; in the other it was extremely probable that it was smallpox.

(b) The only "bad arms" out of hundreds done that have come to our attention were constituted by slight imperfections about the bases of ulcers, due to prematurely knocking off the dried "buttons" after the vaccination process was quite complete, the buttons having become somewhat loosened but not ready for removal. It must be added, however, that in some arms which had been banded despite instructions to the contrary, the bandage was pulled up more than was necessary, and in a few instances the pustules opened.

For civilian practitioners, not able to employ eight or nine assistants to do the washing, etc., the technique, nevertheless, is so simple that no one vaccination operation need take over five minutes. Its great advantages in civil life are:

(c) Not even adolescent girls object to the punctures; there is no fainting, etc.

(d) There is no waiting, after the vaccination is done, for the vaccine to dry. The instant the puncturing is finished the surplus vaccine is wiped off and the sleeve pulled down.

(e) No bad arms, and no loss of vaccine due to bad arms.

(f) In all open methods of vaccination

ping, scarifying, cross-hatching, etc.) obvious source of "bad arms" is infection of the open wound, during and after removal of the epidermis, from the spray of the vaccinator, his assistants and the patients themselves, especially there be a number of the latter, crowding the office and all talking at once, as often happens. In the puncture method no epidermis is removed; moreover, the process is rapid, and the exposure of the arm so short, that this really serious source of infection in the older methods is almost completely eliminated.

of a good tincture three times in the twenty-four hours. This dose can be increased if the heart shows signs of dilatation; 10 drops used by the mouth or hypodermically can be given every three hours, care being taken that the quantity given is not large enough to cause poisoning by this most useful drug. Remember that when one uses digitalis he uses it because the patient surely needs help. Therefore see that the digitalis is obtained from a source which will insure a potent article. Good digitalis may be life saving, while a worthless drug may sacrifice a life that otherwise could be saved.

Strychnine.—Pharmacologists tell us that strychnine neither raises the blood-pressure nor stimulates the heart. Be that as it may, doses of 1/30 of a grain every three or four hours, used hypodermically, are of great value. The patient rests better, his pulse is stronger, he is distinctly improved by its use. Therefore, in severe cases in which there is toxemia, and in which the circulation is poor, Fussell believes full doses of strychnine are not only indicated but are useful.

Caffeine.—The alkaloid in two- or three-grain doses by the mouth, or caffeine sodium benzoate hypodermically, is of value when the patient is weak, either from grave toxemia or from failure of the circulation.

Camphor.—In the form of camphorated oil used hypodermically, one or three grains of camphor every one or two hours is useful. It is by no means a specific, but sometimes will help to lift the patient over the incline.

Nitroglycerin.—This is a much-abused drug. It is not a heart stimulant. The pulse becomes fuller after its use, but this is because the peripheral vessels are dilated. It is of apparent use when the heart is laboring and fighting against a high pressure. Then the peripheral vessels are enough dilated by the use of the drug to allow the heart to become more efficient. Cyanosis and a laboring heart are the indications for its use. It should be used in full doses for a short time.

Oxygen.—This gives relief to the patient with much cyanosis and laboring heart. The

USE OF ETHYLHYDROCUPREIN IN DISEASES OF THE EYE.

In the *New York Medical Journal* of January 24, 1917, ZENTMAYER states that ethylhydrocuprein (optochin) is a valuable agent in the treatment of pneumococcal infections of the eye. It often acts as a specific in pneumococcal ulcers of the cornea, especially if the treatment is begun before active tissue destruction has occurred. Almost all cases of this type of corneal ulceration under the action of this agent, to use the words of Ramsey, manifested a shorter and conspicuously more favorable course than did those dealt with in earlier days by the well-recognized methylene blue formerly in use. The evidence at hand indicates its value in diseases of the cornea and conjunctiva due to other organisms than pneumococcus or to other causes is incipient on which to base a conclusion.

TREATMENT OF CROUPOUS PNEUMONIA BY OTHER THAN SPECIFIC METHODS.

The *Pennsylvania Medical Journal* for January, 1917, contains an article by FUSSELL in which he writes as follows of certain well-known drugs:

Digitalis.—This in the writer's experience is the most useful single drug in cases of pneumonia with an organic heart disease. Digitalis should be given from the beginning of the attack in moderate doses, ten drops

respirations are quieted, the heart labors less. It is a good adjunct to fresh air. Fresh air, however, will usually make its use unnecessary.

Calomel.—If there is much abdominal distention this will do good by causing bowel movements and by apparently lessening the tendency to fermentation in the intestinal tract.

Eserine and Pituitary Extract.—These are of value where there is much abdominal distention. They appear to cause the expulsion of gas from the intestinal tract by stimulating the muscular coat.

THE TREATMENT OF COUGH.

STEWART in the *Practitioner* for February, 1917, in discussing the treatment of cough points out that the therapeutics of this common and useful branch of practice divides itself into two classes, viz., the useless and the useful cough.

Among the first are classed the dry stage of acute and chronic bronchitis, the initial stage of asthma, and the irritable cough of pleurisy. The rational treatment indicates an alteration, when possible, of the dry inflamed mucous membrane into a moist one. The dry bronchial surface must be stimulated to produce a sufficiency of thin liquid secretion, which can easily be got rid of by the useful cough. The cause being removed, the cough practically ceases. The remedies which produce this most promptly are the iodides, the action of which is often hastened when combined with an alkaline salt. Ten grains of iodide of sodium or potassium given four-hourly loosens the secretion in a very short time. In the worrying, dry, night cough of phthisis, caused by tough viscid mucus, ten grains of iodide, combined with a sedative if the irritation be excessive, administered at bedtime, gives great relief.

As an adjuvant to the iodides, expectorants are usually prescribed, but these, Stewart thinks, are of little value, and our knowledge of their action is purely empirical. The best expectorants are the

iodides. They flush the whole of bronchial tree with thin mucus, and nature does the rest. Before any appreciable amount of expectorants can be obtained, the dose must be pushed so as to produce emesis; thus their effect is purely mechanical. Their striking use can be clearly demonstrated in a bad case of asthma, in which the lungs are mucus clogged; when vomiting has been produced by the administration of either apomorphia, ten grains of ipecacuanha, or three grains of tartar emetic, the effect is most striking, and grateful to the patient. Both apomorphia and tartar emetic get the credit of being depressants. Apomorphia has the advantage that it not only acts as an emetic, but is a sedative as well. In fact Hare uses it in small doses with great success in the treatment of delirium. The depressing action can be counteracted by strychnine, given in the same injection. Ipecacuanha may be used with impunity, and the dose repeated if necessary.

The use of morphia in these cases should, if possible, be avoided. Though the sedative action is prompt, it really prolongs the attack by the diminution of bronchial secretion.

When the cough is excessive and produces irritation, the sedatives usually employed are opium, morphia, or some of their derivatives, the chief of which are heroin and codeia. Opium is generally given in the camphorated tincture of opium, or morphia in the compound tincture of chloroform and morphia (B. P.), or as the official liquor. The latter may be given as a very palatable and effective linctus, made up with hydrobromic acid, gum acacia, and chloroform water. Heroin and codeia also can be given in the same way, omitting the acid with heroin, for it is easily decomposed. Enterprising American firms have advertised heroin extensively, but as a rule the use of these preparations is not to be recommended; still they very often come in as a pleasant change to phthisis patients, who are often whimsical and most exacting.

The potency of morphia and heroin is just about equal, and is useful in "ringing

the changes." When a patient has become accustomed to morphia, the sedative effect is lost after a time; then a change to heroin or codeia makes an agreeable and effective variation.

If by any chance morphia disagrees, and the cough is convulsive, a combination of chloral and antipyrin may be given with profit. Stewart now dispenses with the chloral and only uses antipyrin, the dose of which should never exceed five grains. In a case of phthisis, when the cough is hard and distressing, with tough sputum, a good combination is ten grains of iodide of sodium, five grains of antipyrin, and, if the cough is irritable, five or ten minims of tincture of chloroform and morphia, given four-hourly. The antipyrin does not lessen the secretion of mucus, and relieves the fleeting pains in the chest so commonly complained of. In such cases the late Sydney Ringer recommended tincture of gelsemium. Stewart has tried this, and finds it acts very well in some cases, whilst in others it is almost inert.

In these days, when the many forms of tuberculin are so popular, the uses of creosote seem to have been forgotten. When the cough is violent it does no good at all, but in cases in which it is mild and chronic, a course of it, extending over some months at least, does a great deal of good. In cases of suspicious bronchial catarrh (formerly known as pretuberculous cough), it has a wonderful effect if it is properly given, and continued for a long period. In all cases of winter cough, the cough of chronic bronchitis, and bronchorrhea, there is no remedy in the Pharmacopœia to equal it. The usual method of administration is to drop it into milk. Given thus, the creosote frequently gets entangled in the teeth, burns the cheeks and tongue, and irritates the pharynx. This can be avoided by mixing the creosote with glycerin in equal parts. Another very good way is to drop the creosote on half a teaspoonful of sugar, and then fill up the remaining half with sugar. If this be objected to, it may be taken in gelatin capsules, mixed in olive oil so as to lessen its corrosive action, each dose being

prepared separately, as the capsule generally leaks.

The dose of creosote should commence at five minims, increasing the dose daily by one minim up to twelve or fifteen. Doses over twelve minims generally disagree. The dose is given after meals, but with some it is best to give each dose just immediately before eating. In this way the creosote is mixed intimately with the food and easily assimilated, whilst no eructations result. Unfortunately, creosote does not lend itself well to compound pharmacy. In cases of chronic bronchitis with wheezing and thick expectoration, Stewart gives the carbonate of creosote. The mixture he finds best is ten grains of iodide of sodium, and twenty minims of carbonate of creosote, held in suspension by gum acacia, the soapy taste of the carbonate being disguised with cinnamon and chloroform water. He finds, too, that this mixture does very well in the tightness and stuffiness of breathing of chronic phthisis, and the attacks of dyspnea, almost amounting at times to attacks of asthma, the result of fibrosis in arrested cases of pulmonary tuberculosis.

EXCRETION OF SALICYL IN THE URINES OF RHEUMATIC AND NON-RHEUMATIC INDIVIDUALS.

In the *Journal of Pharmacology and Experimental Therapeutics* for February, 1917, HANZLIK reaches these conclusions:

1. The total excretion of salicyl is about 15 per cent less in rheumatic than normal individuals.
2. This difference is greatest in the early periods after the administration of the drug—that is, during the first ten to twenty hours.
3. The concentration of salicyl in the blood of rheumatic individuals at "toxicity" is less, and the concentration in the urine at this time is also less than in normal individuals.
4. These differences are not due to diuresis, nor to retention and vicarious excretion of the salicyl.
5. They seem to be due to an increased

destruction of the salicyl in the febrile rheumatic organism.

6. A lessened excretion of salicyl was demonstrated in a number of individuals representing such conditions as chronic alcoholism and morphinism, tuberculosis, and diminished renal functional efficiency as compared with normal individuals.

7. The administration of sodium bicarbonate together with the salicylate has practically no effect on the excretion of salicyl in the urine, or its "toxic" effects.

HOME-MADE BREAD SUBSTITUTES FOR DIABETIC PATIENTS.

In the *British Medical Journal* of January 20, 1917, NICHOLSON states that for some two years or so he has given up all proprietary flours and breads, and orders a bread made of peanut flour and casein. This is made for him quite easily in the kitchen of the Hull Royal Infirmary, and his private patients make it quite well at home. It has the advantage of being very nice to the taste, and can be cut readily in slices even as thin bread-and-butter. He has now several private patients who have made the bread twice a week and eaten it regularly for a year or two, and they like it.

The white of egg is beaten to a snow, and then the other ingredients (previously lightly mixed) are slowly added. The bread is baked in a sound oven in a tin.

Recipe.

Peanut flour, eight ounces.

Casein, two ounces.

A pinch of salt.

White of egg, twelve ounces.

Peanut flour is not expensive, and was offered to Nicholson a few months ago at 1s. 2d. for 3 pounds. The peanuts can also be bought. They should be placed on the top of the oven for a short time, when the husk can be rubbed off with the hand and the nuts ground in a small mill which can be bought for 2s. 6d. Casein can be bought anywhere. The whites of eight or nine eggs measure 12 ounces; though they are just now dear, most good housekeepers have put down a number in water-glass when they could be obtained at sixteen a shilling, and

these will do very well. The yolks come for the patient, fried or in any other way, or they can be used in the kitchen for other things.

This bread when tested with iodine gives only the faintest blue reaction. If preferred, the yolks also can be used in making the bread, and then only half the number of eggs is needed; but the bread is yellow, and Nicholson does not think it is so nice. The peanut flour can be replaced by almond flour, but it costs more, and his hospital cases do not like it as well.

He might add that casein and cream, suggested by Dr. Williamson in the *British Medical Journal* a year ago, have been very satisfactory in Nicholson's hands.

He has lately treated several cases on the alimentary rest scheme with very good results. It is sometimes called the starvation scheme, but this is a bad name, and one that does not commend itself (under that name) to private patients. He gives for half-pints of black coffee in twenty-four hours, and nothing else; this he has found patients will take for three, four, or even five days without complaint. By that time the sugar has disappeared entirely from the urine. He then gradually adds cabbage 2 ounces, and in a day or two an egg, and then half a pint of beef tea, increasing each day or two (if no sugar appears), so that in ten or fifteen days the patient is getting meat 2 ounces, casein 2 ounces, cream 2 ounces, beef tea 1 pint, cabbage 10 ounces (or other green vegetables), three eggs, tea or coffee 2 pints, with cream, and some peanut bread with butter.

TREATMENT OF THE DRUG HABIT AND ITS RESULTS.

DERCUM in the *Pennsylvania Medical Journal* for February, 1917, thinks that an important point in regard to the treatment of the morphine habit should be emphasized, and that is that during the withdrawal of the drug certain symptoms mark their appearance. These vary somewhat with the gradual or abrupt character of the withdrawal, but they are never absent at the withdrawal, is actually taking place.

Just as soon as the latter is effective, the patient becomes restless. Restlessness may become very marked and is always accompanied by a more or less marked insomnia. The patient is apt also to yawn or to sneeze a great deal. Often he complains of having caught cold, or perhaps he has an attack of difficult respiration simulating asthma. At times all of the symptoms of a frank attack of cold in the head or a troublesome cough make their appearance. In addition, the patient complains of a sense of oppression, is distressed and frightened, becomes fault-finding and resistant, and declares himself dissatisfied with the treatment.

The restlessness may become extreme; involuntary movements of the legs and arms may make their appearance, the limbs being thrown about the bed; at other times distinct involuntary jerking and tremor make their appearance. Sometimes there is palpitation of the heart or a sense of fluttering in the precordia. Vesical tenesmus also may be noted.

If the patient has been in the habit of taking large amounts of morphine daily and the withdrawal has been abrupt and complete, a sense of great weakness and fatigue supervenes; the patient is soon unable to stand or to walk. He trembles from exhaustion and his body becomes bathed in sweat. There is a profound sense of sinking in the epigastrium, and very frequently gastric and abdominal pains make their appearance. Soon nausea, vomiting, and profuse diarrhea set in, the heart's action becomes weak, the pulse rapid, the extremities cold. In severe cases, or if the symptoms be not relieved by a temporary recourse to the drug, the patient may become greatly agitated and disturbed, moans or cries out, or may become confused or delirious.

It is exceedingly probable that the long-continued ingestion of morphine gradually results in the production of an antitoxin, so that little by little the patient becomes more and more tolerant to the drug. This tolerance or relative immunity can be explained on no other ground. Hirschlaff indeed has demonstrated the production of such an

antitoxic principle experimentally in animals. It would seem that the symptoms arising during the withdrawal of the drug are largely due to the unantagonized action of the accumulated antitoxin. The sweating, the vomiting, the diarrhea can only be looked on as the efforts on the part of nature at elimination. For us the symptoms of withdrawal have an all-important diagnostic significance. It stands to reason that if in a given case none of these symptoms be present and if the patient continues comfortable, in good spirits, sleeps well, and is contented, he is obtaining the drug surreptitiously.

SCOPOLAMINE AND MORPHINE IN LABOR.

In *The Practitioner* for April, 1917, JOHNSTONE states that he has never seen any harm to the mother result from this treatment, but, on the other hand, a great deal of benefit. Nor has he ever seen a child lost through the employment of these drugs.

The method to which experience has gradually led him is as follows: In a primipara, a first injection of 1/6 of a grain of morphine and 1/100 of a grain of scopolamine (hyoscine hydrobromide) is given as soon as the pains are coming regularly and strongly at intervals of about seven to ten minutes, and the external os has definitely begun to open. In multiparæ, the same initial dose is given as soon as the pains are coming regularly and strongly, provided the labor may be expected to last at least four hours. It is essential that all such disturbances as the giving of an enema should be got over first. The first dose begins to produce its effect after from fifteen to twenty minutes, but Johnstone does not think the patient can be regarded as in any sense in a "twilight sleep" until after the second dose of scopolamine alone has been given. The initial dose of morphine intensifies the effect of the scopolamine and gives it a chance, which, if used alone, it would not have in the presence of pain, to dull the sensorium. This dulness may easily be maintained subsequently with minimum doses of scopolamine.

mine, provided the second dose is given before the effect of the morphine has begun to diminish. This, Johnstone thinks, is an important point, and he has found that it is almost always best to give the second dose of scopolamine about 45 to 50 minutes after the first dose. Usually the second dose is $1/200$ of a grain of scopolamine, but if the patient is deeply affected by the first dose he gives less, perhaps $1/400$. Thereafter, in the great majority of cases, the sleep can be maintained with doses of $1/400$ of a grain of scopolamine at intervals of about an hour to an hour and a quarter. He does not think the best results can be obtained or expected by following any rigid routine in regard either to dosage or to the interval injections. The effect varies to some extent in different patients, and each one ought, if possible, to be judged separately, these points being decided by her condition as estimated either by a memory test, or by the extent to which she appears conscious of such manipulations as examinations. Experience soon enables one to form a good idea of how deeply she is drugged without employing any particular or specific test.

During the whole time the maintenance of absolute quiet in the room is an important point, and one to which nurses in particular require to be educated. Darkening of the room by drawing the blinds or curtains is also important, and, unlike Giuseppe, Johnstone has never found any difficulty in doing this, nor can he imagine any in an ordinary middle-class house. The patient should never be left alone. Either doctor or nurse must be in the room all the time, and if the former leaves the house, he must look in at frequent intervals, and inform the nurse of his whereabouts. Johnstone may have been unfortunate, but he does not think he has had quite such good results when he has left a case to routine injections by the nurse.

He usually administers a little chloroform during the actual passage of the head over the perineum. This prevents the patient making sudden movements.

All the 70 cases referred to were con-

ducted in private houses or nursing homes. Forty-eight of the patients were primiparæ and the maternal complications included albuminuria, cardiac disease, and minor degrees of contracted pelvis. With the exception of one breech case, they were all vertex presentations, and 17 were occipit posterior in position. In 28 cases there was complete amnesia, the patient remembering literally nothing of the labor after the first or, more often, after the second injection. In 39 there was marked, but not complete amnesia, with considerable analgesia. Of this class of results, multiparæ who have previously gone through a labor without treatment are the best judges, and all such, with only one exception, were emphatically of opinion that the treatment had helped them greatly, and had left them feeling much better at the end of the labor.

In two cases the injections produced much excitement that they had to be stopped and chloroform administered. In one the drugs produced absolutely no effect whatever.

With regard to the children, in only two private cases has he ever had any anxiety, even momentary. Strangely enough, these were both children of the same mother, a multipara. In the first instance the labor ended much earlier than had been anticipated. On the second occasion, omnopon had been used instead of morphine. The child was the first of twins, and was followed twenty minutes later by a second, which cried at once. In both these cases a warm bath was the most effective restorative.

In about half of his cases forceps were used, a little chloroform being given for an operative interference; but being a firm believer in the wholly beneficial effect of the timely and careful use of forceps, he does not feel prepared to say that the use of the drugs increased the need for their employment to any great extent. Nor does he think that the injections greatly increase the duration of labor, certainly not seriously. He does, however, think that there is a slightly greater tendency to uterine relaxation during and immediately after the third

stage, and although he has never had a serious hemorrhage, he makes it a practice to inject ergot or pituitrin in all these cases as soon as the placenta is born.

When the patient wakes up, an hour or two after the delivery is completed, one of the most striking benefits of the treatment becomes apparent, namely, the quite extraordinary sense of well-being. Owing to the painful stimuli having failed to make any lasting impression on the brain, there is an absolute absence of shock or prostration, and, to experienced *multiparæ*, this has been a perfect revelation. Just at first there may be a certain amount of incoherence in thought and speech, but that rapidly passes off.

Johnstone adds one or two more practical points. First, he has a thorough distrust of solutions of scopolamine, and always uses it in compressed hypodermic tablets. Secondly, although he has given as many as eleven injections to one patient more than once, he has hardly ever repeated the morphine. It is beyond doubt that it is the morphine that produces the oligopnea in the child, and, accordingly, it should never be given if there is reason to expect the birth within two and a half hours. He thinks Dr. Fairbairn's six-hour rule on this point errs on the safe side, and would exclude many suitable cases. Dr. Hedley's rule of never beginning the treatment in the second stage is a little sweeping, although Johnstone agrees with him that the best results are never got when this is done.

With all deference to Giuseppi, Johnstone must confess that he is not in the habit of worrying over the fetal heart. He believes that it is the morphine that affects the fetus much more than the hyoscine, and as he never repeats the morphine—or hardly ever—he thinks that in most cases repeated auscultation of the fetal heart is unnecessary. He knows of no real evidence that the hyoscine in the minimum doses recommended affects the fetal heart to any dangerous extent. In any prolonged labor one auscultates, but not because one is employing scopolamine.

By those about to try the treatment for

the first time there are two points worthy of remembrance. The first is that the aim of the treatment is not anesthesia, nor even analgesia in the first place, but amnesia. If the injections result in the patient appearing to suffer no pain during the uterine contractions, then she is definitely overdosed. The patient ought to groan and move herself a little during each pain, and in the intervals fall into a sleep. During the pains she may answer questions, or complain of the suffering in perfectly coherent language, and ask for water, which should be given her. But in spite of this apparent consciousness of the sufferings, she will be found to have afterward little or no recollection of it.

Secondly, the babies after scopolamine-morphine treatment are usually a little sleepy, and rarely cry much for the first twenty-four hours. But provided the child is breathing regularly, even though slowly, there is no danger. If its color is bad, then the usual artificial respiration is required, and Johnstone has found a warm bath most helpful.

In all probability a slightly cyanosed baby would come right in due course without any treatment at all. But while Johnstone has never had the courage to act upon this opinion, he does think that there is some unnecessary nervousness about the minor degrees of cyanosis and oligopnea occasionally experienced with this treatment.

On account of the time and personal attention needed, Johnstone doubts if the treatment can ever be expected to be adopted widely in general family practice. Anything like indiscriminate use of it would certainly be dangerous.

A SIMPLE DIETETIC TREATMENT IN DIABETES MELLITUS.

In the *British Medical Journal* of February 3, 1917, WILLIAMSON says that he desires to call attention to a simple method of dietetic treatment which he has found of the greatest service, in many cases of diabetes, in checking the glycosuria, at least temporarily. It is free from risk, quite palatable, and can be taken by almost all

patients. It is worthy of trial in most cases of diabetes if the ordinary diabetic diet does not promptly check the glycosuria.

The treatment lasts for a week or ten days only; during this period the patient ceases work and rests on the sofa. Every two hours from 8 A.M. to 10 P.M. he receives a small amount of food—eggs, cream, milk, beef tea, and tea—according to the following diet sheet:

- 8 A.M.—Coffee or tea, with one tablespoonful of cream. One egg (poached, boiled, or buttered).
- 10 A.M.—A glass of warm milk (half a pint).
- 12 NOON.—Custard (prepared from one egg and half a pint of milk).
- 2 P.M.—A glass of warm milk (half a pint).
- 4 P.M.—Tea, with one tablespoonful of cream. One egg (poached, boiled, or buttered).
- 6 P.M.—Cream, 2 tablespoonfuls in half a pint of warm beef tea.
- 8 P.M.—A glass of warm milk, or one egg beaten up and added to half a pint of warm beef tea.
- 10 P.M.—Cream, two tablespoonfuls, in half a pint of warm beef tea.

The order of these meals may be varied or slightly modified as the patient desires. The patient takes no other food. The bowels are kept regular.

In many cases the glycosuria ceases in a few days, in other cases in a week or ten days, although an ordinary rigid diabetic diet had failed to check the sugar excretion. If the sugar excretion does not cease on this diet of eggs, cream, milk, and beef tea, carried out as just described, in the course of a week or ten days, Williamson discontinues it and tries some other method of treatment. After the glycosuria has been checked he changes gradually, at the end of seven or ten days, to a diet of solid food. First a little diabetic bread is allowed with the tea and egg at 8 A.M. and 4 P.M., and two of the other meals are diminished or omitted. Then a day or two later bacon and green vegetables are allowed, followed by a custard, in place of the meals at 12 noon and 2 P.M. The meals at 10 A.M., 6 P.M. and 8 P.M. are omitted, and the tea and egg taken at 5 P.M. instead of 4 P.M. If the glycosuria does not return then the bacon at midday dinner may be replaced by fish,

and later by fowl or meat. Later the ordinary diabetic diet may be allowed, and still later, if no sugar returns in the urine, a small amount of white bread may be given.

Of course, this treatment for a week or ten days with the diet of eggs, cream, milk, and beef tea, in the manner just described, does not remove the glycosuria in all cases of diabetes; but it is interesting to note how often it will do so, when a previous treatment with the ordinary rigid diabetic diet has entirely failed to check the sugar secretion.

If the glycosuria returns at a later date, the patient may try again for one week the diet of cream, eggs, milk, and beef tea, and repeat it from time to time if necessary.

The permanent value of this treatment cannot yet be estimated, but it is a method which is more prompt and powerful than the ordinary rigid diabetic diet.

The dietetic treatment (with cream, eggs, milk, and beef tea) just described is (1) simple; (2) less expensive than diabetic breads and foods, and specially suitable now on account of the increased price of diabetic foods through the war; (3) it can be taken by nearly all patients, and is quite palatable; (4) it can be taken by nearly all patients who cannot take casein or biogene; (5) it does not require any very special care or watching; (6) it is very useful and suitable in the case of diabetic children; (7) it is often very successful, and often removes the glycosuria when an ordinary rigid diabetic diet has failed; in other cases, like all other treatments, it is not successful; (8) after taking this diet for seven or ten days the patient may then often take an ordinary rigid diet, and continue it for a long period without the return of the glycosuria, whilst previously such a diet had entirely failed to check the glycosuria; (9) in some cases it removes the diacetic acid as well as the sugar, but not in many others; (10) probably it is not so often successful as the treatment with casein (which Williamson has previously published), but if it should fail, the latter treatment may then be tried, or a combination of the two methods may be tried.

The diabetic treatment described in this article should be continued for seven or ten days only. It is to be regarded as a method usually very much more successful than an ordinary rigid diabetic diet in removing the glycosuria temporarily, and its after-effects probably continue much longer. If later the sugar returns in the urine the treatment may be repeated. The earlier the treatment is tried the more likely is it to produce satisfactory results. It is worthy of trial in most cases of diabetes if the ordinary rigid diet does not check the glycosuria in one or two weeks.

VENEREAL DISEASES AS WE SEE THEM TO-DAY.

MCDONAGH (*The Practitioner*, December, 1916), who long since suggested that the spirochæta pallida is not the sole cause of syphilis, but only the adult male form of the leucocytozoön syphilidis, after quoting Harrison to the effect that this extraordinary work received no confirmation, reports that it has been repeated and confirmed by Peyri of Barcelona, and by Klausner of Prague.

He speaks with some truth of the fact that the longer a view in medicine takes to be accepted, the more correct it is, and *vice versa*. He published his work in German to prevent the Germans repeating the work and publishing it as their own discovery. One publisher wrote him saying the publication was impossible, for the work caused considerable annoyance to the professors of the city.

He severely criticizes the statistics of the Royal Commission on Venereal Diseases. He sums up his own view concerning the lessening of incidence of venereal diseases as follows: That nothing short of prevention is going to diminish the spread of venereal diseases. All we can do at present is to aid those infected, and strive to discover some preventive measures. Preventive measures are what we are in need of most, and such measures are most likely to come from men who are confining themselves to the study of venereal diseases, and combining pathological and clinical work. The best way to get such men is to make

whole-time appointments, to be held by one or more men in every town which has a population of over, let us say roughly, 30,000 inhabitants. These venereal specialists would in no way be hampered, for the treatment, etc., in vogue at each town would be that which the specialist himself deemed the best. Every incentive should be given to the men appointed to do research work, the incentive being in the form of money promised, according to the practical value of the research work done. The best men would soon come to the fore, and they would be judged by the merit of the work they produced.

As to the cause of syphilis, McDonagh speaks of "The German Syphilitic Trinity," by which he means that the spirochæta pallida is the sole cause of syphilis; that a positive Wassermann reaction signifies that the patient has active syphilis; and that Ehrlich's salvarsan cures syphilis, owing to its parasitotropic properties. All these contentions he denies:

DIAGNOSIS OF DEATH AT THE FIRING LINE.

SATRE (*La Presse Médicale*, Dec. 4, 1916), writing upon this topic, states that the decision as to whether a wounded man be living or dead may be extremely difficult, but in case of doubt resuscitation should be attempted at once and should be continued according to Laborde from six to twelve hours, particular confidence being placed upon rhythmical traction of the tongue. This long continuance in the absence of signs of respiration or cardiac or respiratory function is not to be expected even under most favorable circumstances, certainly not at the battle front. Therefore whilst the means of resuscitation are vigorously practiced it becomes desirable to discover a sign by which it may be known whether or not life is extinct. It is held that feeble circulation may be maintained in the entire absence of perceptible cardiac motion as detected either by palpation or auscultation. Without any cardiac motion circulation is, of course, still. It has been

abundantly shown that if the circulation be still for a maximum of fifteen minutes, the restoration of life is impossible. Therefore the question is to decide as to whether the circulation is or is not absolutely stilled. This Itard settles by injecting two grammes of fluorescence dissolved in 10 cm. of an alkaline solution. If there be any circulation at all this drug injected into the buttocks or abdominal wall will be carried through the vessels to all parts of the body and produce a magnificent jaundice perceptible on both the skin and mucosa, whilst the eye becomes comparable to an emerald in its green color. Ambard and Brissemoret, noting that in death the splenic pulp and liver pulp shortly become acid, make their test by thrusting the needle of the syringe into one of these organs and withdrawing the needle slowly, whilst suction is made in the barrel of the syringe until such point clears the viscus involved. Thereafter the splenic pulp and liver parenchyma are placed on tournesol paper and show acid by turning the latter a rosy pink. The needle should be seven or eight centimeters long. The action is perfectly characteristic two hours after death, less marked half an hour after death, but still perfectly clear. This acidification of the viscera is due to an autolysis of tissues. The suction of the syringe is maintained both during and with the withdrawal of the needle from the viscus, and any accidental blood drawn along with the tissue is wiped off on a paper before the shreds of tissue are subject to the test. The author continues his remarks to the effect that one should find rigor mortis or decomposition before pronouncing a patient really dead.

ANTERIOR POLIOMYELITIS.

WHITMAN (*Medical Record*, Dec. 16, 1916) thinks orthopedic treatment is that which aims primarily to keep the machinery in condition to take up its work, if repair of the nerve centers permits, and to adapt by some means the disabled members to the needs of the individual. The prevention of deformity is of the first importance, because deformity throws the machinery out

of gear. By far the larger number of patients in all classes of society become deformed to a greater or less degree and are therefore necessarily disabled, deformity being the inevitable consequence of disease unless it be prevented. The cause of deformity may be classified as the force of gravity; persistent attitudes; unbalanced muscular action; weight-bearing and locomotion.

The influence of the force of gravity is best illustrated by the hanging down of a paralyzed foot when the patient is sitting or recumbent. After a time the habitual attitude becomes fixed by contraction. Thus the hanging foot, or what is called equinus, is the most common of deformities.

Certain attitudes are often induced by discomfort, or they may be simply accommodative, as the sitting posture, in which the limbs are bent at the hips and knees. Thus flexion contraction at these joints is very common among patients who are unable to stand.

The muscles in health vary in strength according to their function and are arranged to support and balance one another. The calf muscle, for instance, is large and strong, because it lifts and propels the body, while the smaller muscles balance the foot. Paralysis of the calf muscle causes great disability with but little immediate tendency to distortion, because it is opposed by the force of gravity; while paralysis of the lateral muscles of comparatively small importance will induce deformity, because the foot is drawn to one side by those of the opposite group.

Locomotion and weight-bearing upon weak and unbalanced extremity exaggerate existing deformity, and increase the resistance to correction. Deformity develops therefore, more rapidly and to a more extreme degree in early childhood than in later years.

Prevention of deformity is the most important part of the treatment from the first to the last, since if it is present it is impossible for normal muscles to act effectively, and for weak muscles to respond to im-

to regain their strength. It develops more rapidly than is generally believed; more rapidly in the most paralyzed cases than in those of complete paralysis, because the influences of the force of gravity and accommodative pressure are increased by unopposed muscular action and by retraction of active muscles that are never as in health stretched to their normal limit.

The first indication of deformity is the presence of discomfort when a habitual attitude is changed—when, for example, a dragging foot is pushed upward. And in cases in which the muscles of the front of the leg are paralyzed and the calf muscles are active, this discomfort is often apparent within a few days of the paralysis; in fact, much of the pain supposed to be symptomatic of the disease is actually induced by tension on contracted tissues.

Preventive treatment consists in moving the joints of the affected part through their full range of motion at least twice daily in order that all the muscles may be extended to the normal limit. Postures should be alternated, and attitudes that lead to deformity should be restrained. If, for example, the trunk muscles are so weak that the body is bent forward or to one side in the sitting posture, the child should not be permitted to sit unless it is properly supported, nor to stand or walk on weak and uncontrolled limbs.

The secondary part of the treatment is directed to the preservation of nutrition of the paralyzed parts. Nutrition depends on the circulation of the blood, and the supply of blood is regulated by the work performed by the muscles. Paralyzed muscles do not work, consequently they receive less blood. Paralyzed limbs become, therefore, eventually shrunken, cold, and discolored; the capacity of the blood-vessels having been lessened because no demand has been made upon them. These changes are far more noticeable in deformed and unused limbs than in those which, although equally disabled, have by treatment been forced to carry out as far as may be their normal functions.

Nutrition may be improved and in some degree preserved by local treatment. That which is usually applied is rubbing and friction, under which warmth and color may be restored to the paralyzed part. Parents do not understand the objects of so-called massage, but look upon it as a direct treatment of the disease, and what they rub in is of greater importance than the rubbing. Oily substances are supposed to feed the weak tissues; actually they only serve to lessen friction, which in these cases is desirable since only gentle rubbing should be permitted.

Baths, to which in health parents are unaccustomed, are thought to possess mysterious virtues, and this belief may be encouraged. A warm bath in which the child may lie extended stimulates the circulation and assures the most favorable opportunity to demonstrate muscular activity in the floating limbs, because it is not opposed by friction and gravity.

The most impressive of all remedial agents is electricity, because the paralyzed muscles may, for a time, respond to its stimulation. It has been employed for many years in the treatment of all forms of paralysis, but no positive evidence has been presented that it has any effect other than as a local stimulant of nutrition. It is far better adapted to the treatment of older patients than of young children, who are usually frightened by even the slight discomfort attending its application.

The treatment that is in the air at present is muscle training. Just as strong muscles may be made stronger by systematic exercise, so weak muscles may be made stronger by exercises adapted to their weakness. This is, of course, self-evident. There are very decided limitations to the method. Paralyzed muscles cannot be trained, and young children are usually poor subjects either for muscle training or muscle testing. The treatment is of great value in suitable cases. If properly applied it should lessen the tendency to deformity and aid the restoration of power in muscles in which such restoration is possible. If all the muscles are equally weak any improvement

in strength is so much gain, particularly in an upper extremity. If, on the other hand, the weak muscles are capable of recovering but a fraction of their strength in opposition to the full power of an opposing group, deformity cannot be prevented in a weight-bearing extremity, except by mechanical or operative treatment.

Braces are used to prevent deformity and to permit locomotion. If the paralysis is general of the trunk and limbs, the child may be placed on a recumbent frame, on which it may be carried about, because if permitted to sit deformities of the trunk would develop, which are progressive and intractable. Or, as a temporary treatment, a plaster support may be applied, which, by fixing the spine, assures the rest that favors the repair of the inflamed spinal cord, and holds the uncontrolled and often sensitive limbs in proper position. Plaster supports are of value, also, as temporary braces during the early stages of the disease, before the extent of the persistent paralysis can be determined.

The braces are chiefly valuable as aids in locomotion; for as soon as the discomfort has subsided a child will insist on moving about, if this is possible. Braces are employed to protect the weak muscles and to lessen the strain upon the joints which would otherwise induce deformity.

Functional use, if properly regulated, is the most powerful of all the stimulants toward recovery, as contrasted with purely local treatment. For the muscles and the nerve centers are interdependent, and if a limb is permitted to become deformed and shrunken from disuse the nerve centers, although capable of transmitting impulses, may atrophy for want of practice, while those upon which constant demands are made should develop their capacity to the highest degree. Functional use is often impossible without support, and the character of this support is, therefore, of greatest importance in treatment, since it must be often changed in adaptation to the needs of the patient.

It has been stated that it is impossible to predict the degree of final paralysis in any

case, since improvement may continue many years. There are, however, very definite indications on which to base the prognosis. In favorable cases there is evidence of returning power in the muscles throughout the paralyzed area of the cord. The instances of functional recovery after many years of helplessness are cases of this type, in which restoration of function has been prevented by deformity, although the nerve centers have been repaired. The unfavorable cases are those in which, in spite of protection, certain groups of muscles in a definite area show no sign of power, while in other areas recovery has been partial or complete.

When the area of permanent paralysis can be accurately determined, usually after an interval of several years from the onset of the disease, operative treatment may be indicated, and this is, from the present standpoint, the most effective of all methods. It consists essentially in transferring active muscles from their original insertion to points where they may work to advantage, thus to restore the muscular balance; and in operations on the bony joints to assure stability, so that braces may be less burdensome or discarded altogether.

In the present stage of enthusiasm, the physician is inclined to think that there is less danger of overtreatment than of neglect, and that as far as young children are concerned the possible benefits of massage, electricity, and muscle training in a clinic are more than offset by exposure to fatigue, and excitement, not to mention the time consumed by the mother.

The clinic should be the central point for observation, supervision, and teaching, and the mother, properly instructed and aided, if necessary by the visiting nurses, must be depended upon to carry out the supplementary treatment. Muscle training, for example, however difficult in its adaptation to many patients, is very simple in its application to a single case; although it requires art, patience, time, and opportunity, and conditions hardly available in a large clinic.

In conclusion, it seems to the author that the contributions of those who are interested in this subject may be used to best advantage by increasing the facilities of the hospitals and clinics already equipped for the work, and by providing a larger number of social workers and visiting nurses, with adequate means of transportation, all under central control, than by establishing new clinics in more convenient localities, on the supposition that daily treatment is essential. In other words, that the best results from the educational, scientific and humanitarian standpoints may be obtained by a concentration rather than by a diffusion of energy.

THE REMOVAL OF STONES IN THE KIDNEY.

W. J. MAYO (*Surgery, Gynecology and Obstetrics*, January, 1917) reports 450 patients subjected to 484 operations with a mortality of 0.6 per cent. The presence of stone was shown by the roentgenogram. By the pyelogram it was located as in the pelvis, calyx, or parenchyma. Gall-stones sometimes gave confusing shadows. Nearly 10 per cent had stones of both kidneys. Unless the condition of the opposite side is acute, the stone from the least involved kidney is first taken away. About two weeks later that from the other side is removed. Where the second kidney maintains considerable function and yet exhibits a large branched stone, this has occasionally not been interfered with and in several instances has not progressed during the course of years. In half the cases of bilateral stone the second kidney was found pyonephrotic, a condition necessitating nephrectomy.

Stones were found in a solitary kidney in three instances; in two in horseshoe kidney. In one of these horseshoe cases pyonephrosis developed in the left half of the organ. This was resected and recovery followed. Two patients showed duplication of the renal pelvis. In each case the caudal pelvis was involved. In one case resection of the upper half of the kidney was necessitated. Stone formation in the remaining kidney after nephrectomy is an uncommon occur-

rence. There were only two instances in the series reported. Multiple stones of the parenchyma of the kidney are prone to recur. In one case 28 were taken from one kidney and 26 from the other, with recurrence within two years in both sides. Multiple parenchymatous stones in both kidneys occur but rarely, according to Braasch in but five of 48 cases of bilateral stones.

One of the most common causes of recurrence of stone has been the attempt to conserve a badly damaged kidney which was of little use functionally and a continuous menace to the future health of the patient.

If both kidneys are involved extensively it will be needful to save them both. After removal of the stones under these circumstances, the pelvis of the kidney should be drained by a rubber tube through the cortex, and each calyx containing a stone, which has extended out into the parenchyma by atrophy necrosis until it can be felt with the finger as a softened area in the cortex, should also be drained separately through a counter-puncture. Drainage provides an opportunity for the relief of the infection and also for contraction of the large renal cavities from which the stones were removed. Small cigarette drains are satisfactory for the drainage of the calyces and smaller stone-containing pockets. Recurrence of stone is sometimes due to an attempt to remove through too small an incision, leaving shells or fragments. If stones are superimposed upon each other the radiograph may fail to show more than a single shadow. Careful examination at the time of operation should be made to exclude this error, and moreover the patient should be roentgenogrammed before discharge from the clinic. The percentage of recurrence of stones will be small, certainly under 10 per cent, if at the time of operation good judgment is exercised in selecting and carrying out the best surgical procedure for each individual case.

Next to soiling from septic contents of the kidney itself, lack of hemostasis is the most frequent cause of those processes which directly or indirectly lead to sepsis and death, or those secondary conditions

which end in recurrence of stone, hernia, or other sequelæ.

Pelviolithotomy was practiced in 206 cases and is the most generally useful operation. The kidney is separated from its capsule and brought well up into the wound, thus exposing the pelvis in the notch. If the stone is felt, it is removed by direct incision, and a search is made by the finger within the pelvis for others. The pelvis is then sutured with catgut, the kidney dropped back into position, carefully surrounded by its fatty covering, and two or three rolls of rubber tissue are introduced into the kidney space to provide temporary drainage. If the stone cannot be felt, the fatty tissues are dissected back from the pelvis in a flap-like manner, and the stone is located by a finger introduced through an incision into the pelvic cavity, and removed. The capsule is then sutured with a few interrupted sutures of catgut, and the fatty fascial flap replaced and sutured in position. Drainage of the pelvis of the kidney is rarely required after pelviolithotomy for uncomplicated stones in the pelvis. In 34 cases a counter-puncture was needful to remove stone situated in the calyces not accessible from the pelvis. In such cases each cavity should be drained separately, at least one tube leading to the renal pelvis. In 40 cases nephrolithotomy was performed, an operation which has frequently been followed by secondary hemorrhage coming on in four to ten days, at times so severe as to require nephrectomy. If more than one cavity is present each is drained.

Nephrectomy was done in 204 cases, subsequent pathologic examination proving the entire wisdom of this course in all instances. In some cases pyonephrosis of the kidney may be encapsulated by a massive wall of connective tissue, and the attempt to remove it with the protective wall will be difficult and may involve wounding of neighboring parts, particularly on the right side, the vena cava, and the duodenum; therefore decortication. The kidney is drawn out of its capsule and the latter is separated with a knife from the sinus of the kidney and is folded back over the

pedicle. This allows the kidney with renal vessels to be drawn through the incision, top and bottom, and makes possible separate ligation of the vessels. The most difficult nephrectomies are those following a nephrotomy which has left a fistula leading to a remnant of kidney. The safest method is to introduce a knife through the fistula into the kidney, and then split all the outer layers until a sufficient opening has been made for subcapsular nephrectomy. If forceps are left on the pedicle they should be unclamped at the proper time—48 to 72 hours. Do not remove them for eight to twelve days afterward in order that the tissues if compressed may have an opportunity to retract. Should the fistula lead into a calcareous pyonephrosis, previous to operation any contained tube should be removed several days before the nephrectomy.

As to exploration, Mayo points out that there are a few cases in which it is impossible for the urologist to determine the actual condition of each kidney by microscopic data and functional tests. Exploration of each kidney may therefore be needful. It may be done by examining the presumably sound kidney before operating on the kidney known to be affected; exposing the affected kidney and judging of its condition the probable functional capacity of the remaining kidney, and opening the peritoneal angle of the incision for exploring the second kidney with the hand intraperitoneally. The latter method has little value unless the kidney to be examined is grossly affected.

Intraperitoneal complications can be readily detected through the peritoneal incision.

In very fat persons or those with congenital deformities, it may not be possible to bring the kidney sufficiently into the wound to remove the stone. Sometimes fracture of the twelfth rib just behind the angle of the scapula give sufficient space. In other instances Mayo has removed enough perirenal fat to expose the kidney *in situ*, much as one would expose the uterus within the abdominal cavity.

Occasionally large renal veins pro-

rhage, usually checked by using catgut and a small needle. Injuries of the colon can be controlled in the same manner. In the case of renal arteries of considerable size which have been injured, primary ligation may be needful since these are permanent arteries. Even considerable laceration of the pelvis due to difficult extirpation of a tumor, closed with catgut and a fascial flap applied about it heals primarily. In one case the pelvis was completely detached from the kidney. It was reattached with catgut sutures, but not in complete continuity throughout the entire circumference. The suture line was covered with a fascial flap and good union and function resulted.

Injuries to the duodenum may occur as a result of rat-tooth forceps and a hasty attempt to check hemorrhage from the neck of a kidney which has slipped. Such injuries should never be used hastily, because of this danger and because the bleeding is so easily controlled by catching the vessels with the thumb and finger. When hemorrhage does occur to the duodenum, the patient will show at the end of a few days that necrosis permits escape of the duodenal contents. Unless the abdomen be opened promptly, the retroperitoneal part of the duodenum exposed, and the fistula sutured, the patient will die within three weeks.

CANCER OF THE LOWER BOWEL.

CHARLES H. MAYO (*Long Island Medical Journal*, April, 1917) states that in this country, due to the increased knowledge of the malignant disease of the large bowel and to the fact that patients are now seen earlier, there has been a gain of nearly 50 per cent in operability. In the Mayo clinic the operability of 53 per cent has advanced to 71 per cent within a few years. If we consider that the operative mortality is nearly 50 per cent lower, that in cancer of the rectum five-year cures have increased from 10 per cent to 35½ per cent in 1900, and that in cancer of the right colon the five-year cures are now 54 per cent including the natural death-rates for

period and age, we appreciate the enormous saving from death and from disease attended with so much suffering.

Within recent years there has been added to the surgeon's work the treatment of non-malignant disease of the colon, such as chronic local and general diseases attributed to intestinal toxemia; also that of chronic constipation and malposition of the colon, especially sagging of the transverse colon. The experience derived from such cases added to that gained from the surgery, which, for lack of a more expressive word, he calls legitimate surgery of the bowel—i.e., the surgery of tumor, diverticulitis, cancer, and obstruction—has developed many points of exceeding interest.

In its development the large bowel is formed on the left side of the spine and rotates around the superior mesenteric artery as an axis, the cecum being under the stomach at the third month of fetal life, then under the liver, finally reaching the right iliac fossa. Such a rotation leads to the observation that all structures necessary to the vitality of the organ are to be found in the inner leaf of its mesentery; the outer leaf is merely attached to the parietal peritoneum, the separation of which along the line of adhesion immediately mobilizes the colon without injury and greatly simplifies operations on it. It is noted that there is great variation in the length of the intestines, both large and small, the total length varying from 12 to 33 feet, or from the short carnivorous to the herbivorous intestine. Metchnikoff laid much stress on the fact that the absorber of liquids is the colon, that the contents of the small intestine, after removal of 90 per cent of the protein food value, are delivered to it in a liquid state. It is also shown that the peristalsis, unlike that continuous form seen in the small intestine, is sudden, active, and intermittent, occurring from two to possibly six times in twenty-four hours in the right colon when the absorption of liquids reduces the mass to proper consistency. The lymphatics play little part in this absorption; it is principally a filtration into the portal venous

system for purification in the liver. Years ago W. J. Mayo pointed out that the removal of the right half of the colon relieved constipation, and later observations show this to be due to the loss of the large absorbing surface. The retention of fluids could be compared in effect to an enema given at the top of the remaining large bowel. There has been sufficient surgery for the relief of the non-malignant or toxemic conditions of the large bowel to show that constipation is merely one of the symptoms, and that its relief is not necessarily a cure of the general condition of the individual.

As the colon naturally harbors several varieties of bacteria a considerable part of the bowel movement is due to the growth and activity of some of them, and because of such bacteria there is an added danger of peritoneal sepsis in operating on the organ. The suture lines must be both gas-tight and water-tight. Tension unrelieved on these suture lines, no matter how perfectly they are constructed, will cause them to give way to necrosis after two days of pressure. Fortunately such tension seldom occurs, yet safety-valves for immediate or secondary use in delivering gases are of great advantage when needed. Thus suture operations on the left half of the colon or transverse colon may be protected from gas pressure by an appendicostomy, and in the removal of the right half the end of the transverse colon may be incorporated in the closure of the abdominal incision, projecting through the peritoneum into the muscle, to be opened if needed. This is necessary in approximately 20 per cent of cases. Bloodgood similarly applies the ends of the bowel into the abdominal incision after resection of the sigmoid with lateral anastomosis of the bowel. The same result is accomplished when tubes are passed high into the colon through the anus, where they are maintained for several days.

Because of the septic character of the contents of the large bowel the lymphatics have been nearly eliminated from the mobile organ; they are very few and inactive as compared with those of the small

intestine, and practically can be considered as connected only with the outer surface. This is of great importance as it shows why malignant disease remains local for such long periods. Thus autopsy findings in death from cancer of the colon prove that the disease was still local in more than half of the cases, death being due to obstruction, perforation, or peritonitis. Vast extensive operations are indicated if the disease is local, and it is to be considered local if there is only contact involvement. If the growth has become attached to the bladder, the attached portion of the bladder should be removed; if attached to the uterus, a hysterectomy should be done. It may be necessary to remove one or two loops of small intestine, or the prostate and seminal vesicles, in order to do a thorough operation. On the other hand, if there are lymphatic glands at a distance on peritoneum or intestine, or if there is distant glandular involvement or secondary growths in the liver or other regions, no radical operation should be attempted to relieve obstruction. If an operation is done it should be palliative only.

Cancer of the rectum below the peritoneum, being fixed, receives greater traumatism from the harder fecal masses than occurs in the movable part of the bowel within the abdomen. Here lymphatics are actively concerned in the transmission of disease, and in the inch and a fourth of the anal canal there is a double lymphatic return. The disease occurring in this region (epithelioma) is fortunately of the slower cell growing type; only 6 per cent of the cancers of the rectum are found in this short outlet; 24 per cent occur between this point and the peritoneum; while the greater number extend from this lower rectum to the upper rectum or rectosigmoid, and are of the adenocarcinoma type.

Perineal operations are often advisable for cancers of the lower rectum. The majority of the cancers are higher, and abdominal exploration is nearly always advisable to determine the extent of the disease and the method of procedure indicated. Thus an ill-advised radical procedure is avoided.

when cure is impossible. Colostomy is not such a serious inconvenience when it can be carefully made without the urgent necessity of acute obstruction; an uncontrolled perineal outlet when the sigmoid loop is also lost is far worse.

THE DESTRUCTION OF ANGIOMAS AND OTHER NEW GROWTHS BY THE INJECTION OF QUININE AND UREA HYDROCHLORIDE.

BABCOCK (*New York Medical Journal*, March '3, 1917) impressed by the intense necrosis produced by the injection of quinine urea hydrochloride in the vascular tissue, used this solution in the treatment of angiomas. A strong solution into the skin produces an instant intense burning, quickly followed by analgesia. The area injected becomes white, anemic, and necrotic, and a few days later a shrunken, adherent black eschar marks the point of injection. The surrounding edema disappears in a few days, the eschar separating slowly, with little evidence of inflammation or pain. If a considerable area has been injected, there is left a deep ulcer which heals slowly, but usually with little pain or inflammatory reaction. If the injection is made deeply into the tissues an area of necrosis occurs which gradually becomes replaced by fibroconnective tissue. Objections to the use of this necrotizing agent are, first, the primary transient but intense pain; the marked secondary anemia; the sluggishness of the residual ulcer; the transient induration of the eschar; and the possibility of serious symptoms from quinine idiosyncrasy.

The advantages of the method are the intensity of the necrosis produced, the persistent anesthesia, the low toxicity, and the convenience of application.

In a cavernous angioma of the inside of the cheek the injection was followed by the escape of a few drops of blood from the needle puncture, after which there was rapid necrosis, the slough separating without any evidence of hemorrhage and with complete removal of the tumor. A painless

edema involving the entire half of the face had largely subsided at the end of a week. Cavernous angiomas of the face in infants are often difficult to treat, as they tend to recur and grow after the use of various destructive agents. In one such tumor of the forehead of an infant that had recurred after the use of electric desiccation, fulguration, the application of carbon dioxide snow, and other measures, the injection was followed by the formation of a black eschar and an apparent cure.

Internal hemorrhoids injected with a twelve- to fifty-per-cent solution of quinine and urea hydrochloride promptly become necrotic and drop off after a number of days. The associated marked edema, especially from the stronger solutions, is a distressing complication, the rectal mucosa projecting through the anus suggesting to the patient that his condition has been markedly exaggerated. Unfortunately in this region the secondary analgesia may not be entirely efficient, and usually the sphincters should be well dilated before the injection; otherwise the patient may at times suffer more from this treatment than from the conventional clamp and cautery operation. For large urethral caruncles the method seems of value. In port-wine stains or birthmarks, or superficial angiomas, an injection in the upper layers of the derma of a weaker solution of quinine and urea hydrochloride enables one to substitute a white scar for the objectionable coloration of the vascular growth. The injection also seems to be very effective in the removal of warts and moles, a few drops of a thirty-three- to fifty-per-cent solution injected under the base of such a growth being followed by a rapid desiccation of the wart, which after a time drops off, leaving a reddened and transiently thickened scar. In a verruca of the hand which had recurred repeatedly after the application of trichloroacetic acid, acid nitrate of mercury, and a solution of ethylate of sodium, this injection not only promptly destroyed the growth, but left a scar that was practically inconspicuous at the end of two months. In the removal of these small growths no

dressings is required, and the black eschar, if upon the hand, is not painful, and usually does not interfere with the vocation. Keratosis and superficial and deep epitheliomas of the skin or mucous membrane apparently may be likewise destroyed by the injection.

An ordinary syringe is employed, and for convenience a thirty-three-per-cent solution of quinine and urea hydrochloride is prepared in ampoules containing 2 Cc. each. With a fine needle the affected area is infiltrated, taking care not to infiltrate too widely. The chief action of the injection is to block the circulation and cause ischemia; therefore the entire area is infiltrated, or a proximal infiltration is so given as to cut off the blood supply. In treating sensitive areas the preliminary injection of a one-half of one-per-cent novocaine solution may be desirable to prevent the initial pain.

TRENCH-FOOT.

FROST (*Boston Medical and Surgical Journal*, March 1, 1917) notes that the symptoms of trench-foot vary somewhat in degree and order of onset, involving both feet usually, occasionally only one foot. After a period of duty in the trenches, varying from a few hours to several days, invariably soaked with cold water up to knees, or hips, the soldier feels that his feet are becoming numb and cold. He knocks them against whatever hard surface presents, to restore normal sensation. In a few hours they begin to swell. This may go on for three or four days. Gradually pain and tenderness develop, impeding walking or making it impossible. The pain assumes several forms: it may be a severe tingling or burning of the foot, most marked at the points of greatest pressure—heel and ball of foot; often it is of a rheumatic type, involving the toes and ankles when movement is attempted. Again, it may extend up the calves to knee and thigh muscles, tingling and pricking—neuritic in type. In these cases the calf muscles are generally tender. The pain is usually

of the first two types, confined to the foot. In a lesser number of cases the first symptom may be pain of the types mentioned, followed by swelling and numbness; or a sensation of swelling, with final onset of pain. The rapidity of development of symptoms varies, doubtless according to individual differences in circulation and resistance. For instance, one case had been in the trenches six days continuously when symptoms began, and on the twelfth day he was incapacitated. Another had been on duty only twenty-four hours when forced to withdraw. In the average case symptoms set in after three or four days' exposure and incapacitate in twenty-four to forty-eight hours.

In clinical appearance there are several varieties of trench-foot, depending upon the degree of exposure. In the simplest type there is a discoloration of the skin, varying from a hyperemia to a dark-red or purple hue. Usually this is confined to the area where greatest pressure is exerted by the shoe; the head of the first metatarsal bone, the first and fifth metatarsophalangeal joints, the big toe, and the joints of the smaller toes. It may involve merely a depression at the base of the toes or extend over the dorsum and external borders of the foot, generally in such cases with some swelling. The sole of the foot is usually not involved. Anesthesia to touch and hyperesthesia, sometimes both, are observed; occasionally pain. The anesthesia is confined to the areas of discoloration and is very common in the toes, particularly the big toes. The hyperesthesia generally occurs in a small zone just outside the anesthetic area, though occasionally it may involve the whole dorsum. Pain is usually elicited by active or passive motion in the metatarsophalangeal joints.

Another type, characterized by somewhat more severe subjective symptoms, seems at first to be normal in appearance. There is no discoloration. In the first day or two there may be some edema; none after. The skin is rough and dry, rather more pruritic than normal. Hyperesthesia is apt to be general and acute, accompanied by numbness

of the toes. In these cases burning tingling may be severe, accentuated to a considerable degree by warm coverings, sensitivity to a fire, or even draughts of air. Pain is elicited by motion in the toe-joints.

The longer exposed, and more severe the chief features are the deep discoloration and edema, often accompanied by blisters and ulcerations. The discoloration is of a deep purple hue, involving in cases of moderate edema the distal portion of the dorsum of the foot, but in the more pronounced cases extending over the back of the foot and toes, even involving the toes. The edema varies from a moderate swelling of the dorsum to an extreme swelling of the foot and ankle, with shining skin, occasionally extending up upon the lower leg. Superficial blisters are often seen in these cases, developing at the points of pressure along the sides of the foot and toes. If the discoloration is only moderate their contents are of a pinkish, serous nature, but in the more pronounced cases they contain a dark, bloody, cyanosed fluid. Ulcerations are common at similar points, developing from ruptured blebs, easily infected and often extending to such a depth as to reach the underlying bone. The toe-nails become black, separating in course of time. In rare cases large blebs with offensive, bloody contents may develop upon the sides and soles of the feet. These feet are painful, preventing walking, tingling burning to an extreme degree, especially at night and when exposed to heat. Diabetic pains are felt in toes and ankles. Occasionally pain, pricking and constant, extends up the leg to the knee, even to the thigh.

After all other symptoms have subsided this pain may persist. Tenderness of the muscles accompanies it. Anesthesia and hyperesthesia are also present: sometimes the one predominating, sometimes the other. In an anesthetic foot there is often tenderness, elicited by firm pressure. Another feature is often noted in these severe trench-feet—muscular paralysis. In the more pronounced cases the

patient is unable to move the foot. Usually only the toes are affected, and the big toe is held in extreme dorsal flexion.

In these more severe types of trench-foot gangrene at times supervenes. As a rule it occurs at the areas of bony projection upon the dorsum of the foot—small, rounded, superficial islands of blackened slough; or upon the joints and tips of the toes, involving the nail. It is more often dry than moist. At times the first and second phalanges of the toes are involved. In the most severe cases, fortunately few in number, the whole foot is involved in a massive gangrene extending to the ankle. Cases of infection with gas bacillus and tetanus have been reported.

The treatment of trench-foot is simple, consisting of elevation, protection from heat, massage with oil and sedatives. With the feet raised upon pillows the greater part of the edema subsides in two to three days. In the majority of cases, with complicating hyperesthesia, coverings of any sort, exposure to heat, even slight currents of air, give rise to intolerable pricking and burning, most severe at night. Hence the feet are placed below a covered cradle, open at one end for coolness. In certain of the cases of generalized anesthesia, heat is well tolerated. As a rule the subjective symptoms are relieved by massage with olive oil. It must be gentle at first, becoming more energetic from day to day. Gradually the blood-vessels recover their tonicity, and the congestion and residual edema disappear. Applications of electricity seem to be beneficial. If the pain persists, various sedative applications may relieve it, such as a mixture in equal parts of the liniments of aconite, belladonna, and chloroform; or of acetate of lead and tincture of opium four ounces, one ounce in water to one pint. Occasionally the pain may be so persistent as to prevent sleep for several days. In such cases, morphine, codeine and other sedatives must be administered. Under this treatment, of the cases not complicated by gangrene, the simplest will recover in about two weeks, the average in three weeks, while the most severe may linger on from

five to seven weeks. In most of these cases, after getting up and attempting to walk, the feet will become congested and a little edematous, with no recurrence of symptoms. In a few days, with active exercise, the congestion and edema subside. The cases of gangrene are longer in recovery. As already mentioned, the gangrene is usually dry, in which case one waits until a line of demarcation has developed and excises or amputates. Certain of the cases of moist gangrene, particularly those involving much of the foot, present urgent and fulminating symptoms, requiring immediate amputation.

The prevention of trench-foot is a matter of some importance. It has been found impracticable to keep dry the front-line trenches in the low-lying districts during the rainy season. Various kinds of long water-proof boots have been considered, but are objectionable in that they impede the activity of the soldier by their weight and bulk. Frequent applications of oil have been found useful. The measure of greatest benefit seems to be a shorter period of duty in the trenches, with more frequent relief. During the first winter of this war the soldier was compelled, through lack of reserves, to stay in the trenches for much longer periods than during this past winter, with the result that trench-feet were much more common and of more severe type.

FASCIA TRANSPLANTATION INTO VISCERAL DEFECTS.

NEUHOF (*Surgery, Gynecology and Obstetrics*, April, 1917) under this title contributes a laboratory and clinical study which is summarized as follows:

The free transplantation of fascia into aseptic fields has a wide sphere of usefulness. It has proved very satisfactory in the replacement of thoracic defects, of aponeurotic defects in operations for various types of hernia, and of defects of the cranial dura. Fascia transplants have been very successfully used in a variety of ways, for the reëforcement or replacement of ligaments, tendons, and paralyzed muscles. They have proved effective as coverings for

wounds of solid organs, especially the liver. Their usefulness has not been clearly demonstrated in other aseptic fields, as sheaths for the isolation of nerves, as strips for occlusion of the pylorus, in fixation or suspension of organs, for separation of joint surfaces.

There are many advantages of fascia over other tissue transplants (fat, muscle, periosteum, etc.) for the purposes mentioned. Fascia (lata) is most readily accessible, is obtainable in almost unlimited quantities, and its removal does no damage. Transplanted fascia has a remarkable tendency to heal in place even under most disadvantageous conditions, requiring minimal nourishment to obviate necrosis. It combines great tensile strength with slight tendency to stretch or to contract. It is most readily adaptable to the shape of any organ and, technically, can be most easily handled. Finally, fascia can be invariably transplanted autoplastically. The other transplantable tissues have some of these characteristics, none of them has all. The ultimate fate of transplanted fascia has not been definitely determined. The experiments reported indicate early disintegration in non-aseptic fields, degeneration at later periods in aseptic fields. Of practical importance is the fact that the resultant firm connective tissue is as serviceable as the original transplant.

These striking qualities led to attempt to employ fascia transplants in non-aseptic fields; in the presence of infection, or about hollow viscera. A few successes and about an equal number of failures followed. The use of fascia for such purposes was deemed undesirable, the successful results having been considered fortunate accidents.

Experimentally, fascia transplants have been found satisfactory for the reëforcement of suture-lines in hollow viscera. They were successfully employed in a few instances to bridge small tracheal fistulæ, and they occasionally prevented leakage from small esophageal and bladder fistulæ. These occasional satisfactory results were found to depend upon healing by contraction of the defect. For this reason failure followed

experimental effort to replace appressed esophageal and vesical defects. The technique employed in these experiments on hollow viscera (and on other organs) was the attachment of the transplanted tissue over the defect. To offer any chances for uniform success a method was evidently devised to prevent the cut margin of the transplanted tissue from rolling back, to give sutures a firm hold on the organ by passing them through all its layers, to more readily support the graft with provisional nourishment, to prevent the overgrowth of the lining membrane of the organ. It is demonstrated that these requirements were satisfactorily met by suturing fascial sheets instead of over defects of hollow viscera (and of other organs). With this technique the following results were obtained:

Esophageal defects (up to about one-third of the bladder-wall) were replaced by fascial grafts with uniform success. The functional and anatomic results were excellent. Functional results were attained by the upbuilding of a new bladder wall. Epithelial overgrowth at the site of the defect was complete at an early stage. The newly formed bladder wall was as thick as or thicker than the original wall, and equally or more resistant to pressure from within. This was probably due in part to the fact that bone formed invariably at the site of the defect, definitely limited to that area. The new tissues appeared remarkably soon after operation, reaching the height of their development in the second or third month. In junction with the bone there was developed typical bone-marrow (and cartilage, in the experiment) and an ensheathing, mesoderm-like layer of connective tissue. The transplanted fascia as such was responsible for the formation of bone, as demonstrated by the development of new tissue when fat was used to bridge the defects. The formation of bone and new tissues was explained by the theory of connective-tissue metaplasia, the assumption being that calcium salts, derived from the bone, were the centers of stimulation. Another uniform feature was the pres-

ence of smooth muscle in the connective tissue occupying the defect. It was continuous with the muscle of the bladder wall. Its presence was accounted for on the basis of smooth muscle regeneration.

The immediate anatomic and functional results of replacement of extensive ureteral defects by tubes of fascia were satisfactory. Ultimate results could not be ascertained, for reasons that have been stated.

Large tracheal defects (involving as much as three cartilage rings and most of the anterior aspect of the organ) were invariably replaced successfully. The anatomic result was ideal, ciliated tracheal epithelium growing completely over the transplant soon after operation. The functional results were satisfactory, the newly formed tracheal wall being rigid and resistant, the narrowing of the tracheal lumen being insignificant.

Large esophageal defects were replaced successfully in all experiments. Slight stenosis developed soon after transplantation; at later stages this was almost imperceptible. Epithelial overgrowth was complete. The functional was as good as the anatomic result.

Perforation through the transplant invariably followed its simple implantation into gastric defects. On the other hand, smooth healing always occurred, even with very large defects, when gastroenterostomy, with or without pyloric exclusion, was added. This striking contrast demonstrates the profound influence of gastroenterostomy upon healing of gastric lesions near the pylorus. Healing was firm and complete, gastric mucous membrane completely overgrowing the site of the defect. In one instance bone formation in the scar tissue was observed. Its development was explained on a basis similar to that suggested in the group of bladder experiments.

Fascia transplantation into small defects in the upper part of the small intestine was occasionally successful, succeeded more often in the lower part of the small intestine, and was most successful in the large intestine. In the latter, larger defects could often be satisfactorily replaced. Healing

took place by the upbuilding of new tissue and partial epithelial overgrowth, as well as by some contraction of the defect.

The following results were obtained in transplanting fascia into defects of organs other than the hollow viscera:

The (altered) transplant became firmly and permanently adherent to large defects made in the liver. Previous experiments had only demonstrated good immediate results, whereas, for stated reasons, the determination of the more distant outcome was considered of importance.

Large defects of the diaphragm were satisfactorily replaced by fascia. The (altered) transplant healed firmly in place, permanently preventing the development of hernia or eventration. Its surfaces were completely overgrown by parietal pleura and peritoneum respectively. Previous experiments had not demonstrated this mesothelial overgrowth. They dealt with immediate results, which were good functionally, indifferent anatomically.

Large pleural defects were satisfactorily replaced by fascia. The final results were good anatomically and functionally. Overgrowth of pleural mesothelium was complete except where the lung was adherent. Adhesions were not encountered in some previously reported experiments.

Good immediate results were obtained in transplanting fascia over large defects of the lung. The firm union prevented leakage of air; the free surface of the transplant was smooth and non-adherent. Final results could not be ascertained, owing to the development of pleural effusions.

The immediate functional and anatomic results of transplanting fascia into large defects of the pericardium were good. Final results could not be ascertained, owing to the development of pleural effusions.

Large defects of the spinal dura were satisfactorily replaced by fascia. Adhesions between the incised underlying cord and the (altered) transplant did not develop. Previous experiments and operations dealt with defects of the cranial dura; adhesions between the transplant and the unoperated brain were encountered.

The clinical aspects are discussed of these groups of experiments. In addition, two clinical reports on fascioplasty into defects of hollow viscera are appended. In one it is demonstrated for the first time that a large urethra can be very satisfactorily and very permanently replaced by fascia. A similar demonstration is made in a large tracheal defect. This is the second case recorded in which fascia has been transplanted into a trachea.

THE EFFECTS OF HIGH EXPLOSION ON THE EAR.

WILSON (*British Medical Journal*, 17, 1917) concludes an interesting paper on this subject as follows:

The normal stimulus (musical note or voice) is an adequate stimulus for the ear and is the best stimulus. Electricity is contraindicated and likely to do harm, as it so easily produces vertigo.

In the totally deaf, bone conduction is perceived before air conduction. It is essential to differentiate vibrations from musical notes.

In those cases summation of vibrations plays an important part in the perception of sound.

There is a marked diminution in the duration of hearing along the whole range of forks, both through bone and air conduction. This corresponds and exists *pari passu* with the concentric limitation of the fields of vision. Often both improve together. From the field of vision is more retracted than the field of hearing, the side having the greater deficiency being the side of hearing.

If the conducting mechanism is damaged or destroyed it not only takes longer to improve, but complete recovery cannot be expected.

Prognosis is good as a rule, especially in cases in which there is no trauma or strabismus in the peripheral organ, no vertigo of aural vertigo, and a normal caloric reaction. The most noteworthy exception so far is damage to the seventh nerve. In these cases hearing returns but not so well and so far as observed not perfectly.

a normal drum membrane, little if any of middle-ear inflammation, and a reaction present.

As a result of the concussion due to blows there is frequently a traumatic strabismus in the ear. This may be accompanied by neurosis (traumatic neurosis), especially headaches and vertigo. Perception of sound is diminished over the whole normal range; the diminution may be so great as totally to abolish perception of sound. The author has not seen this yet associated with tone islands. What he does find is a diminution all along the scale both for bone and air conduction. As the deafness diminishes there may be at first for a long time an inability to grasp faintly what is said or to retain the memory of it. Thus a word may have to be repeated two or three times before the patient gets it; or, if he be asked to repeat three numbers given consecutively, he will repeat the last one; he knows that there were others, but did not get them.

ECTOPIC PREGNANCY.

STLIER (*Surgery, Gynecology and Obstetrics*, February, 1917) records 100 cases of ectopic pregnancy. The pathological conditions found led him to conclude that ectopic pregnancy occurs about as often on one side as the other. If previous inflammatory condition of the tubes were the sole cause, we would expect the condition to be prevalent on the left side.

That the pregnancy is located about as frequently in the inner half of the tube as in the outer; that interstitial and ovarian pregnancies are of rare occurrence.

That tubal abortion is the variety of ectopic pregnancy most commonly found, whereas of the other varieties erosion of the tube is much more common than rupture from distention. Severe hemorrhage may result from tubal abortion and erosion of the tube. It is uncommon for the ovarian tube to be eroded. Rupture into the broad ligament is conspicuous by its absence.

That double ectopic pregnancy is very

common; that ectopic may be associated with normal pregnancy; that interstitial ectopic may push its way into the uterus and continue to grow; that it is possible for ectopic pregnancy to occur twice on the same side.

That the termination of ectopic pregnancy usually occurs in about six weeks, pregnancies later than three months being uncommon.

That most ectopic pregnancies die (a) and are discharged into the abdominal cavity and absorbed; (b) they become a tubal mole and are absorbed; (c) the fetus disintegrates and forms an abscess in the abdominal cavity.

As to the symptomatology, a review of the facts leads to the following: Ectopic pregnancy is for the most part rather a subacute disease, a disease in which the symptoms continue with one or more exacerbations for one or more weeks, the patient gradually becoming weaker and weaker until relieved by operation or death of the pregnancy. The so-called acute cases, violent cases, are very much in the minority. Therefore we must think of ectopic pregnancy as a disease comparable to a more or less severe type of salpingitis, many of the symptoms of which it has.

The pain of ectopic pregnancy is of importance, very much like the cramps of intestinal colic; it is often taken for such. Not all cases have pain of a cramp-like character, however. Very often associated with these cramps is a feeling of faintness, vomiting, chilly sensations, and constipation, misleading the physician in the direction of intestinal disturbance.

The classic feature of a skipped period is absent in a majority of cases. This fact is of importance as a warning not to place too much faith in the symptom as a necessary concomitant of the symptom-complex of ectopic pregnancy. One feature of the menstrual epoch is present with considerable regularity—irregular spotting or severe bleeding continuous with menstruation or during the intermenstrual period. The color or the consistence of the blood is of no diagnostic value. Irregular bleeding so

often accompanies adnexal inflammation, however, that it is in itself not diagnostic.

Ectopic pregnancy is not a disease of normal temperature. Some temperature is present in almost every case, with a range between 99.5° F. and 100.5° F.

Pulse-rate and blood-pressure are of little diagnostic importance except in those cases in which the frequency of the pulse is out of proportion to the temperature.

The blood picture is not satisfactory. Leucocytosis is present in a large proportion of the cases, and a low red count is generally accompanied by a high white, but this does not occur regularly and the results are often confused.

The presence of albumin and casts in the urine in a large percentage of cases is significant.

Irritation of bladder and rectum is much more common than is generally supposed.

The physical examination, abdominal and bimanual, reveals the usual signs of peritoneal irritation, tenderness, distention, and rigidity—more or less pronounced; and the bimanual examination often discloses a mass in the pelvis. These symptoms, however, are present in salpingitis. There are certain symptoms, nevertheless, which seem to be of special value: (1) exquisite tenderness out of proportion to other local symptoms; (2) the situation of the uterus in the normal position, movable and not in retro-position fixed; (3) the boggy sensation to the mass in some cases; (4) the enlarged uterus and soft cervix; (5) rarely the blue vagina. In many patients, however, there is nothing but exquisite localized tenderness to guide us in our diagnosis.

The analysis of 106 cases of tubal pregnancy leads to the conclusion that there is no one diagnostic symptom peculiar to the condition. The symptom-complex, however, if complete, affords an easy diagnosis. If the patient, who has had previous pelvic trouble and has passed two weeks over her period, is suddenly seized with cramps in the lower abdomen which are localized to one side, if the patient begins to flow, feels weak and vomits, if she has a temperature of about 100° F. with pulse of 120, and

she goes to bed and after a few hours is relieved, and in two or three days is able to be up and around, only to have the attacks repeated, once or perhaps several times, and if examination reveals a pale woman, with some local distention and rigidity of the abdomen with peculiar exquisite tenderness to one side of the uterus on bimanual examination, the presence of a boggy or elastic mass, the uterus enlarged and in position, the cervix soft, vagina blue, then the diagnosis should be made without any difficulty. Unfortunately, these symptoms are not often assembled in such a satisfactory manner, and the diagnosis is then very difficult. Only too often the uterus is curetted for a supposed abortion or the patient is treated for salpingitis or appendicitis.

There should be no difficulty in diagnosing the acute variety of ectopic pregnancy. Out of 106 cases, 6 were diagnosed before rupture, 70 after; in 30 the diagnosis was improperly made.

Out of 106 cases, seven died. Five belonged to the acute type, one died while being prepared for operation, two without operation, three following operation and one suddenly thirteen days following operation, in apparently good health, from pulmonary embolism. The mortality is therefore low, and with proper care the patients generally recover.

Of this series of cases all, with but four exceptions, were operated on as soon as the diagnosis was made. Of the four cases excepted, two were in such acute shock from loss of blood that it was deemed advisable to wait in the hope that the patients might react from the initial shock; the other two died before the abdomen was opened.

The conclusions reached from observation of these cases would seem to be that all subacute ectopic pregnancies should be operated on at once, removing from the abdomen the tube affected, the fetus, placenta, membranes, and blood. All acute cases should be operated on at once except cases *in extremis*. In these cases it would seem advisable to wait, watching the patient

carefully. If no improvement occurs in a very short time, operate. Two cases in a series bled to death; the ovarian artery had ruptured in both. One was an initial pregnancy. As there is no danger therefore, that patients can bleed to death, operation must not be delayed too long, waiting for a reaction in these exceptional cases. The abdominal route was used in all these cases, and it is undoubtedly the only safe procedure to follow.

SIMPLIFIED SURGICAL TONSILLECTOMY.

ROSEN (Chicago Medical Recorder, 1917) always employs ether as a general anesthetic. As a local one adrenalin chloride, 1 drop to the ounce of 1-per-cent solution of novocaine, or 1/10 of 1 per cent of cocaine, is used. Two injections are made into the anterior pillar, one on each side and two through the tonsil tissue just behind the capsule, between it and the posterior constrictor of the pharynx, one on each side and the other low down. The incision should be made into the mucous membrane, but not through it, and in such a way that blebs will appear on its surface. In this way almost a complete anesthesia is obtained. A very satisfactory degree of ischemia is readily obtained. All children under 10 years of age should be narcotized. In more than half the author's adult cases have been done under local anesthesia. All patients get a small dose of atropine hypodermically thirty minutes before going to the operating-room to lessen the salivary secretions.

Under general anesthesia the patient lies flat on his back. If operations are done under local anesthesia, the patient is seated in a chair with a nurse steadying the head from behind.

The right tonsil is removed first. It is grasped by the volsellum forceps at its upper and lower poles and drawn out forward and up toward the median line. In this way it outlines itself clearly beneath the anterior pillar. The anterior pillar knife is then introduced under

the edge of the pillar at the superior pole, where it readily finds the line of cleavage between the tonsil capsule and pillar. It passes from above downward, always in plain view, underneath the pillar toward the inferior pole. Here the point is turned directly inward toward the tongue, so that the part of the pillar which is attached to the lower jaw and base of the tongue remains intact. The glistening white anterior surface of the tonsil is now readily exposed by pushing the freed anterior pillar back with the blunt convex surface of the knife. The posterior pillar knife is now passed over the superior pole of the tonsil into the superior tonsillar space, and back into the line of cleavage between the posterior pillar and the tonsil capsule. It is then carried downward until the posterior surface of the gland is entirely free. The superior pole is now tilted inward toward the base of the tongue on the volsellum so far as the attachments of its neck surface to the fossa will allow. These attachments are kneaded away by the convex blunt surface of the posterior pillar knife well down toward the inferior pole.

The snare loop is now slipped over the tonsil and made to encircle the remaining attachment of the gland to the lower part of the fossa, including the plica triangularis. Considerable care should be taken to keep the wire snugly against the tonsil base behind, with the slack of the loop in front. In this way the uvula is never in danger. The tonsil is removed by slow ecraseur.

The tonsil fossæ of every tonsillectomy case should be dry when the patient is returned to bed. To allow a severed vessel to go untied is universally admitted to be bad surgery anywhere except in the throat. Here hemostasis has been left almost entirely in the hands of fate. Just why this should be so is not apparent, especially when bleeding can be controlled with the same ease and precision as in any other part of the body. To do this the anterior pillar must be drawn forward as soon as the tonsil has been removed, and the entire fossa explored for bleeding points. As all

of the vessels that enter the tonsils are of microscopic size, it follows that there can be no generalized oozing of blood in this locality, the frequent allusions to and the descriptions of the same to the contrary notwithstanding. Very frequently a vessel is found lying bare in the fossa a quarter of an inch or more. If its lumen is pointed against the smooth wall of the fossa it can very easily give the appearance of an indefinite general oozing, in much the same way that water coming out of a garden hose, whose end is being held directly against the ground, seems to well up all over instead of spurting from one particular spot. On close examination, however, blood will be found to issue from a definite point. This should be caught immediately with a suitable artery clamp, while the other tonsil is being removed. Or, if the bleeding occurs in connection with the second tonsil, the hemostat should remain attached for a minute or so. If the bleeding still continues when it is removed, or if it was particularly active to begin with, or if for any extraneous reason, such as high blood-pressure, slow clotting, etc., troublesome hemorrhage is to be expected, the pillars should be immediately sutured.

The soft palate is drawn forward, the threaded needle is introduced behind the posterior pillar opposite the bleeding point, and passed deeply through it and on, superficially, beneath the floor of the tonsil fossa toward the anterior pillar. Here the needle must stop, otherwise the tissues through which it is passed because of their extreme friability will be torn. The pillar pusher now is slid down along the shaft of the needle, whose point will always come into the V-shaped opening if the two instruments are kept parallel to each other. The pusher works the point through the anterior pillar until the eye carrying the silkworm-gut comes into view. The suture hook at the other end of the pillar pulls the thread forward, while the eye itself slips back over the distal end of the silkworm, along the same path by which it entered. A double knot is tied. If the stitch has been taken in the right location there will be no further

bleeding. A second one is, however, occasionally required. By using the first palate tractor the needle very readily passes through the approximated pillars in the location, and to any depth that is desired. In one or two cases when the stitch failed to catch the floor of the fossa, ballooning of the pillar occurred, with formation of a hematoma underneath. This fact is mentioned to emphasize the importance of including the floor of the fossa in the pillars in the suture.

The suture is cut out at the end of twenty-four hours by a straight, blunt-pointed scissors introduced between the pillars and the gins. The closed scissors are then pushed from the superior tonsillar space toward the base of the tonsil fossa, and the slightly agglutinated pillar surfaces, thus separated, readily fall into their normal positions. Scarcely a mark can be seen to indicate the former location of the suture. There is no edema except when both pillars have been sutured. With the exception of a slight sensation of tightness in the throat, the patient is entirely comfortable while the suture remains *in situ*.

RETROVERSION OF THE UTERUS ETIOLOGY AND RATIONAL TREATMENT.

WILLIAMS (*Boston Medical and Surgical Journal*, April 19, 1917) after a discussion of five of the most popular methods of treatment of this condition concludes his excellent study of the subject as follows:

Retroversions of the uterus may be divided into three classes:

(a) Inflammatory, in which the uterus is displaced by a pus mass and the fundus afterward drawn backward by adhesions.

(b) Congenital, in which the retroversion may be said to be the normal position of the uterus for that individual.

(c) Acquired, as the result of injury or relaxation consequent upon childbirth, in which the retroversion is not a congenital *per se*, but a part of the general process of prolapse.

In retroversion of the first class,

ment is directed primarily to the inflammatory process and the displacement is corrected only incidentally.

Congenital retroversions are usually symptomless and require no treatment.

Retroversions acquired as the result of parturition should be considered as a step in prolapse of the uterus and the downward as well as the backward displacement corrected.

Retroversion is an infrequent cause of sterility in itself.

Retroversion may cause miscarriage if the uterus becomes incarcerated, but most retroversions are corrected spontaneously during the early months of pregnancy.

A retroverted uterus discovered on postpartum examination, if obviously congenital in type, needs no treatment. If of the acquired type, the malposition should be corrected and treatment by pessary instituted, deferring operation if possible until the patient has passed the child-bearing period.

REVIEWS.

A HANDBOOK OF PRACTICAL TREATMENT. By Many Writers. Edited by John H. Musser, M.D., and Thomas C. Kelly. W. B. Saunders Company, Philadelphia and London, 1917.

This fourth volume of the Handbook of Practical Treatment has been brought out with the idea of giving the various original contributors the opportunity of making in their articles such changes or modifications as are indicated by the progress of therapeutic knowledge. Moreover additional articles have been written by new contributors who have become known through their valuable contributions to medical science, such, for instance, as the Treatment of Cerebrospinal Syphilis by Swift; Hay Fever, by Goodale; Acidosis, by Howland and Marriott; Occupation Diseases, by Gilman Thompson; The Governmental Prophylaxis of Disease, by Samuel G. Dixon; Specific Therapy of Dental Suppuration, by Smith and Barrett; Splenectomy as a Procedure in the Anemias, by Krumbhaar and Pearce; Specific Principle of Pneumococcus Infections, by A. R. Dochez; Postural Treatment of Abdominal and Visceral Disturbances, by Goldthwait; Diseases and Surgical Treatment of the Spinal Cord, by Elsborg.

In the supplementary volume will be found all the newer methods of treatment that have been shown to be efficacious in the handling of disease. Nor is this statement controverted by a review of the work. Thus Blumer gives an extremely brief and

very lucid résumé of Food Intoxications, including the avitaminoses, to wit, Beriberi, Pellagra, and Scurvy. Pancoast's section on Roentgen Therapy is especially commendable. Otis in his section on Tuberculosis gives an extremely satisfactory description of the Technic of Artificial Pneumothorax. Ashford briefly but comprehensively summarizes recent knowledge bearing upon Tropical Diseases. As a repellent to mosquitoes he advises the following mixture: 1 part oil of bergamot; 10 parts of kerosene or citronella oil; 6 parts of vaselin. Attention is called to the fact that all malarial attacks seem to be marked by Urobilinuria. De Schweinitz has written on the Ocular Complications of the Infective Diseases in his usual terse and lucid style. Hall's section on Animal Parasites is a summation of recent knowledge concerning this subject. It is worthy of note that such practical subjects as the Starvation Treatment of Diabetes, Treatment of Acidosis in Children, Diabetes, Gout, etc., are considered from the essentially modern standpoint.

There are few books the surgeon, the physician, or the specialist could attentively read from cover to cover from which he might obtain as much instruction bearing directly upon his daily work and making him more efficient in his particular line. The editors deserve high praise for having so skilfully balanced to a symmetrical whole the work of many distinguished authors.

NOTES AND QUERIES.

FIGHTING DOCTORS.

The *British Medical Journal* of May 19, 1917, gives this interesting historical note appropriate to these times:

In an account of a cutting-out operation by gunboats the commander of the expedition was said to have asked for a "fighting doctor" to be sent to him. The doctor, whose proper function is the saving of life, is not generally expected to handle weapons of destruction, but there have been instances in which he has been carried away by the fighting spirit in the excitement of battle. Many years ago we knew an old army surgeon who at Waterloo threw away his bandages and tourniquets and took part in the famous charge of the Scots Greys, holding on to the stirrup of a horseman. According to Kinglake, the Duke of Cambridge in the Crimea on two occasions owed delivery from a position of embarrassment to army surgeons. When the Guards were hard pressed at Inkerman, the Duke went in search of reënforcements, and a remnant of the regiment had to be brought out through a heavy Russian column by Dr. Wolseley, who was, we believe, a brother of Lord Wolseley. The Duke was rescued a second time in the same action by the pluck of another doctor. Dr. Wilson was attached to the brigade of Guards as a volunteer assistant surgeon from the 7th Hussars. At a most critical moment of the battle he got the Duke of Cambridge out of a position of extreme danger. For this service he received the thanks of the Duke at the head of the brigade after the battle. Sir Anthony Home won the V. C. during the siege of Lucknow "for persevering bravery and admirable conduct in charge of the wounded men left behind the column, when the troops under the late Major-General Havelock forced their way into the Residency of Lucknow, on the 26th of September, 1857." The details are given in the *London Gazette* of June 18, 1858: "The escort left with the wounded had, by casualties, been reduced to a few stragglers, and being entirely separated from

the column, this small party with wounded were forced into a house which they defended themselves till it was set on fire. They then retreated to a few yards from it, and in this place continued to defend themselves for more than twenty-two hours, till relieved. At last six men and Mr. Home remained to the end. Of four officers who were with the party, one was badly wounded and three killed. The conduct of the defense during the latter part of the time devolved therefore on Mr. Home, and to his active exertions previous to being forced into the house, his conduct throughout, the safety of the wounded, and the successful defense is mainly attributed." Dr. Ryan, author of "Under the Red Crescent," took an active part in leading Turkish troops at Plevna.

But fighting doctors have usually shown their warlike spirit defending their patients. In the Paris revolution of 1832, when a crowd threatened to attack the Invalides, Larrey took up a position at the main entrance and told the attackers they would have to pass over his dead body to get to his patients. Lieutenant-Colonel J. Reynolds won the V. C. by his active defense of the wounded under his care at Rorke's Drift. A correspondent of the *Cronique Médicale* gives some other instances. In a French retreat in one of Dumouriez's campaigns during the war of the Republic, the serious cases could not be removed from the hospital at Aulnay-Chapelle, and Surgeon-Major Bavay remained at his post. After the evacuation of the town by the French the population attacked the hospital. Bavay distributed guns among the orderlies, barricaded the doors, and held back the assailants. In another battle Surgeon-Major Martin, when the French retired placed his wounded in wagons, marched in the rear of the column, and foot by foot disputed the ground with the enemy. At the evacuation of Lisbon the surgeon-in-chief, Jean Béguyer, pistol in hand, defended his patients against the insurgents.

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THE NON-SURGICAL TREATMENT OF PELVIC INFECTIONS.

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The wise business man takes account of stock, reviews his methods, and considers new procedures for the extension of his business. It is equally important that the conscientious practitioner should occasionally pause for consideration of his methods of procedure to determine whether they are based upon sound principles, wise judgment, and the proper utilization of the forces at his command. Upon the judicious exercise of proper treatment, the utilization of nature's forces, will depend the recovery of health and the restoration of function. To one who has lived through the last four decades a review of the progress of medicine in the treatment of pelvic inflammation presents problems, solved and unsolved, of the deepest interest.

At the beginning of this period the responsibility of infection for inflammation was generally unknown. The simultaneous introduction of such knowledge and the institution of surgical measures by Tait for the removal of its results led to such an extension of surgical procedures as threatened to imperil the safety of the race. The results of medicine were hidden, uncertain, and evanescent, while those of surgery were apparent, and seemed the direct road to the affected structures. It appeared in accordance with the Scriptural injunction, "If a member of thy body offend thee, pluck it out and cast it from thee." The inclination to early resort to surgery was

encouraged by the teaching of men like Noeggerath that such infections as gonorrhea once developed were subsequently incurable: teaching which subsequent experience has demonstrated to be erroneous. Naturally when accepted that an individual thus infected was regarded as incapable of having the functions of procreation re-established, conditions existing in such organs which make ill health inevitable, the logical inference would be that operation removed nothing of value to the infected individual, but withdrew only what would otherwise be a constant menace to her future comfort and happiness. Fortunately, notwithstanding the advocacy of surgery with all the skill an enthusiast may employ, many victims of infection declined to accept of its benefaction, and not only recovered good health but were able to bear children. Such unexpected results naturally led to an analysis of the conditions producing them. Careful observation disclosed that many cases of infection recovered both comfort and function under non-surgical means when it had been the custom to subject cases of a similar character to sacrificial procedures.

The study of such cases justified the assertion that non-surgical treatment presents the following advantages:

First, in the great majority of cases the spread of infection is limited and the patient may recover both health and function.

Second, the patient is spared the peril, the discomfort, and traumatism of a surgical procedure.

Third, the patient will much more readily submit to treatment.

Fourth, where organs are destroyed by the infection the patient is still amenable to relief by surgical measures, and at a time when she is free from danger through the spread of infection.

The disadvantages are:

First, it is difficult to maintain the confidence of the patient and her friends in a course of watchful waiting when there is no apparent improvement from day to day. The many advisers of the family will suggest physicians who would treat the case actively and make certain the removal of the causes of her disease, so that it often seems necessary to resort to some procedure for maintenance of control, and the selection will be for something which is least capable of causing injury.

Second, the convalescence is slower than in a radical measure, but prolonged morbidity is compensated for by lessened mortality.

Third, a small percentage of cases will still have to submit to operation through local suppurative collections when it will be felt that the patient could have been saved time and suffering by earlier resort to surgery.

It is true that an occasional abdominal infection will be overlooked. It is very easy to mistake an appendicitis occurring early in the puerperium. Although experience has disclosed that the patient may recover without operative procedure, the advocates of early operation may assert that delay is unwise. The study of large numbers of cases has demonstrated that the mortality is greatly lessened by delay. In infection following both labor and abortion it requires considerable moral courage to withhold the use of the curette. Of course every case should be examined, and when the os is open and a mass of retained placenta can be felt there is no objection to withdrawing it with a pair of placental forceps; should the cervix be closed it

would be unwise to use forcible measures of dilatation to investigate and empty the organ. In such cases the uterus will fill itself with less injury to its protective barriers than could be accomplished by means of mechanical measures. In the presence of retained products with infection the patient will have soon passed beyond the point of removal by the curette, and its employment is only breaking down nature's barriers, opening up new avenues for the spread of infection. This knowledge of the spread of infection led to the employment of hysterectomy, but here it was soon realized that it did not always enable the operator to save his patients by exceeding the limits of the disease, and that what he did the possibilities were that the patient would have recovered had the mutilating operation been withheld.

No physician should feel justified in resorting to surgery unless local manifestations are present. These indications are most frequently found in the tube and ovaries, or in the uterine sinuses. Delay is chiefly advantageous because the limit of the infecting organisms is self-limited, and a late operative procedure lessens the danger of spreading active organisms.

If we are not to employ surgical measures, what shall be the course of treatment? The first consideration should be about the rest, mental and physical. Solicitous relatives and friends should be rigidly excluded. Any disturbance of the circulation should be avoided to promote the distribution of infective process. The promotion of elimination by mild purgation; the administration of fluids through drinking of water, and when this is not practicable its employment by proctoclysis, hypodermoclysis, or intravenous injection of salt solution, are efficacious measures. By proctoclysis enemas of 6 ounces salt solution may be given every three or four hours; or by continuous hypodermic stillation (Murphy), thirty drops to the minute. Solutions thus administered are particularly indicated in peritoneal infections when the belly is distended and the contents of the stomach and small intestine are not transmitted to the large bowel.

consequently are but slightly absorbed. The subcutaneous and intravenous procedures are utilized only in urgent cases when the fluid is not retained by either mouth or rectum. The spread of the infection is also limited by the application of cold in the form of an ice-bag applied over the pelvis, especially when associated with elevation of temperature. If the temperature subsides, and with it a lessening of tenderness, the cold should be replaced by heat. This may be used in the form of fomentations—a cloth wrung out of hot water placed over the abdomen, this covered with paraffin paper, then by a dry cloth, and heat maintained by a hot-water bottle or an electric pad. The disappearance of the remains of inflammatory exudate may be promoted by the application of pressure over the abdomen in the form of bags of shot, three to five pounds to each bag, and also by the employment of pelvic massage. The latter can be utilized to break up adhesions when recent, disperse collections of exudate, and facilitate restoration to position of displaced pelvic organs. The massage is best accomplished by fixing the uterus with two fingers of one hand in the vagina and manipulating the structures through the abdomen with the other hand. A more or less fixed organ may be thus pushed or pulled backward, forward, and from side to side, thus stretching adhesions and breaking apart adherent surfaces. Hot vaginal douches, glycerin-soaked vaginal tampons, and hot fomentations, associated with rest, should supplement the massage. Neither pressure nor massage should be employed when there is reason to suspect suppuration. The regulation of the action of the bowels, the use and assimilation of proper nutrition, and the improvement of the general condition are essential to the attainment of the best results.

The question will be suggested, Can this employment of non-surgical measures afford equal assurance of subsequent comfort and usefulness? It is very difficult to form conclusions from the statistics of patients treated in the wards of a hospital, because many of them have been subjected to oper-

ation previous to entrance which will or has insured wide-spread infection. The patients are used for the instruction of students in gynecological procedure, and the majority of them are women with families requiring them to get back to their duties and to those dependent upon them, so there is the constant temptation to expedite their exit by some surgical procedure.

In 296 cases of incomplete abortion treated in the wards of the Jefferson Hospital as reported by me in the *Journal of the A. M. A.*, October 9, 1915, there were thirteen deaths, five, or 3.8 per cent, of which occurred in those subjected to some surgical procedure, while eight, or 4.7 per cent, followed in those not treated surgically. However, it must not be overlooked that no patients were refused admission, and the majority of these were fatal cases and had been subjected to surgical measures before admission to the hospital, whose condition was such as to preclude its subsequent employment. The study of these cases and a comparison of the non-operative with those in which surgical measures were employed were sufficient to make one regret that they could not have been treated expectantly from the beginning.

I have no purpose to condemn surgery in proper cases, when local collections of pus can be recognized in tubes, ovaries, wall of uterus, or about the uterus; but to emphasize the assertion that the presence of pelvic infection made evident by masses of exudate in the pelvis, where often intestines, tubes, and ovaries are matted together, is not a condition demanding resort to surgery, until it is evident that suppuration so extensive as to be otherwise irrelievable is present. A surgical operation in the majority of such cases will appear to demand the removal of the uterine appendages, and such a measure, even should the patient recover good health, cannot be considered curative. The latter term should be reserved for those in whom both health and function are restored. That such a cure can be established under non-surgical

measures has been made evident by the experience of a large number of women who have suffered from either puerperal or non-puerperal infective conditions who have not been subjected to operation, and

who have subsequently enjoyed good health and given birth to children. Give patient a chance for cure; surgery cannot be employed when other measures prove futile.

THE INFLUENCE OF THE METHOD OF ADMINISTRATION UPON THE DEGREE OF TOXICITY OF STROPHANTHUS PREPARATIONS.*

BY L. W. ROWE. M.S., DETROIT.

The use of strophanthus in therapeutics as a heart tonic is becoming more widespread from year to year. Digitalis has for a long time been the favorite cardiac remedy and still maintains a high degree of usefulness, but its slow and more cumulative action contrasted with the more rapid and more certain effect of an active principle such as strophanthin is largely the reason for the increased use of strophanthus preparations. There is another factor which has greatly influenced the use of heart tonics in general and of strophanthus in particular, and that is the increasing use of our only means of determining the activity of these preparations, namely, physiological standardization. The extreme potency and variability of strophanthus preparations have long been recognized in an approximate sense, but it was only as recently as 1897 and 1898, when Houghton¹ introduced the first satisfactory quantitative method of physiologic assay for heart tonics, that our knowledge of the comparative potency and variability of strophanthus preparations became definite. Since that time the standardization of heart tonics by physiologic methods has been slowly taken up and perfected, so that by its aid the manufacture of comparatively uniform strophanthin and tincture strophanthus has been accomplished.

As the use of strophanthus increased the clinical data established certain therapeutic doses of each preparation for oral administration. Authorities differed somewhat as

to the average oral dose of the most active preparations, ouabain and strophanthus, largely, as they thought, because of variable absorption, but since preparations of strophanthus are not so extremely potent as ouabain, oral administration no great harm was done other than causing some confusion.

The greatest trouble and confusion experienced, however, when clinicians began to follow the general trend of recent medication and to administer strophanthus hypodermically or intravenously. The pharmacology of strophanthin had not been very carefully studied or emphasized, though Hatcher and Bailey in 1900 called attention in a rather general way to the increased toxicity of strophanthin when administered hypodermically. This warning was apparently not heeded, as the physician in most cases has followed the generally accepted rule of using about half the recognized oral dose for each hypodermic or intravenous administration.

The serious difficulties encountered in hypodermic usage demand that further attention be drawn to the somewhat peculiar action of strophanthus preparations in order to emphasize and thereby minimize the danger attending their hypodermic or intravenous administration. It is with this purpose in mind, as well as with a desire to add to our scientific knowledge of the comparative activity of such important drugs, that I have carried out a series of experiments which may be briefly outlined as follows:

Four strophanthus derivatives which have been or which might be used

*From the Research Laboratory, Parke, Davis & Co., Detroit.

hypodermic administration were selected, namely, Kombe Strophanthin, Ouabain (*Gratus Strophanthin*), Tr. Strophanthus U.S.P. 9th Rev., and Strophanthone Dilute. The degree of toxicity of each was carefully determined by three different methods of administration, namely, oral, subcutaneous, and intravenous. The animal used throughout the experiments was the guinea-pig.

The sample of Kombe Strophanthin (the strophanthin from pharmacopœial drug) used was one of Merck's products, which had been assayed by the M. L. D. frog method and found to be of average activity (100,000 H. T. U. per gramme based on an M. L. D. to frogs of .0000010 gm.).

The sample of ouabain used was a Merck product which had previously been found to be the most active of three samples examined by the one-hour frog method, but which contained 185200 H. T. U. per gramme when tested by the M. L. D. method. It was consequently not quite twice as active as the Kombe Strophanthin by the latter method.

Tincture of Strophanthus, though not adapted to hypodermic or intravenous injection in the undiluted form, is however so active that it can be diluted to such a degree if occasion should arise, that it could be injected hypodermically without serious results. It was therefore thought advisable to determine the intravenous and subcutaneous M. L. D.'s of this preparation in order to make the comparisons more complete. The average tincture has 1300 H. T. U. per mil.

Strophanthone Dilute was the fourth and last member of the series. This is an aqueous solution of the active ingredient of strophanthus and consequently is well adapted to hypodermic and intravenous administration. It is standardized by physiologic assay and contains 100 H. T. U. per mil in ampoules.

The following tables give the results of toxicity tests of the four preparations upon guinea-pigs, three different methods of administration being used:

TABLE I.
Kombe Strophanthin—Oral Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	298	.000015	1-100	.44	Lived
2	328	.000020		.68	Lived
3	290	.000025		.73	Lived
4	255	.000025		.64	Lived
5	247	.000030		.74	Lived
6	240	.000035		.84	Died
7	265	.000030		.80	Lived
8	262	.000030		.79	Lived
9	247	.000035		.87	Lived
10	247	.000035		.87	Lived
11	316	.000035		1.11	Lived
12	341	.000040		1.36	Died
13	291	.000040		1.16	Lived
14	354	.000040		1.42	Lived
15	327	.000040		1.31	Lived
16	317	.000045		1.43	Died
17	291	.000045		1.31	Died
18	301	.000045		1.35	Died

M. L. D. of Kombe Strophanthin orally is .000045 gramme per gramme body weight.

TABLE II.
Ouabain (Gratus Strophanthin)—Oral Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	339	.000005	1-500	.85	Lived
2	394	.000015		2.95	Died
3	300	.000010	1-100	.30	Lived
2	316	.000010		.32	Lived
5	323	.000010		.32	Lived
6	339	.000012		.41	Lived
7	296	.000015		.45	Lived
8	286	.000015		.43	Lived
9	263	.000015		.39	Lived
10	336	.000020		.67	Died
11	254	.000020		.51	Died
12	248	.000020		.50	Died

M. L. D. of Ouabain orally is .000020 gramme per gramme body weight.

TABLE III.
Tincture Strophanthus U. S. P.—Oral Administration.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose, Cc.	Result.
1	454	.0008	1-3	1.09	Lived
2	465	.0010		1.40	Lived
3	463	.0012		1.67	Lived
4	457	.0015		2.06	Lived
5	428	.0018		2.31	Lived
6	500	.0018	1-2	1.80	Lived
7	554	.0020		2.22	Died
8	584	.0020		2.34	Died
9	566	.0020	None	1.13	Died
10	518	.0020	1-2	2.07	Died
11	540	.0022		2.38	Died
12	382	.0022		1.68	Died
13	430	.0025		2.15	Died
14	475	.0025		2.38	Died
15	381	.0025		1.91	Lived
16	362	.0025		1.81	Died
17	441	.0030		2.65	Died

M. L. D. of Tr. Stroph. orally is .0020 mil per gramme body weight.

TABLE IV.
Strophanthone Dilute—Oral Administration.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose, mils.	Result.
1	225	.09	None	20.25	Died
2	252	.08		20.00	Died
3	280	.07		19.60	Died
4	293	.06		17.58	Died
5	212	.05		10.60	Died
6	257	.04		10.28	Died
7	281	.03		8.43	Lived
8	260	.04		10.40	Lived
9	287	.04		11.48	Lived
10	303	.03		9.09	Lived
11	327	.03		9.81	Lived
12	378	.02		7.56	Lived
13	358	.05		17.90	Lived
14	320	.05		16.00	Lived
15	330	.06		19.80	Died
16	230	.06		13.80	Died

M. L. D. of Strophanthone Dilute orally is .060 mil per gramme body weight.

TABLE V.

<i>Kombe Strophanthin</i> —Subcutaneous Administration.					
Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	393	.0000008	1-6000	1.45	Died
2	248	.0000009		1.34	Died
3	316	.0000007		1.33	Died
4	320	.0000006		1.15	Died
5	340	.0000005		1.02	Died
6	461	.0000004	1-8000	1.48	Lived
7	412	.0000005		1.65	Died
8	384	.0000006		1.84	Died
9	298	.0000004	1-5000	.60	Lived
10	297	.00000045		.67	Died
11	291	.00000045		.65	Died

M.L.D. of *Kombe Strophanthin* subcutaneously is .00000045 gramme per gramme body weight.

TABLE VI.

<i>Ouabain (Gratus Strophanthin)</i> —Subcutaneous Administration.					
Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	452	.00000030	1-10,000	.90	Lived
2	406	.00000025		1.02	Lived
3	375	.00000030		1.12	Died
4	423	.00000025		1.06	Died
5	355	.00000030		1.07	Died
6	321	.00000020		.64	Lived
7	355	.00000015		.53	Lived
8	325	.00000025		.81	Lived
9	314	.00000025		.79	Died
10	278	.00000025		.69	Lived

M.L.D. of *Ouabain* subcutaneously is .00000030 gramme per gramme body weight.

TABLE VII.

<i>Tr. Strophanthus U. S. P.</i> —Subcutaneous Administration.					
Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	256	.00003	1-50	.38	Lived
2	331	.00005		.83	Died
3	311	.00007		1.09	Died
4	363	.00003		.54	Lived
5	347	.00004		.69	Lived
6	346	.00005		.87	Died
7	367	.000045		.83	Died
8	350	.000045		.83	Died
9	382	.000040		.78	Died
10	355	.000040		.71	Died
11	310	.000040		.62	Lived
12	336	.000035		.59	Lived
13	302	.000040		.60	Lived

M.L.D. of *Tr. Strophanthus* subcutaneously is .000045 mil per gramme body weight.

TABLE VIII.

<i>Strophanthone Dilute</i> —Subcutaneously Administered.					
Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	280	.0004	1-5	.56	Lived
2	233	.0006		.70	Died
3	226	.0008		.90	Died
4	367	.0004		.78	Lived
5	353	.0005		.88	Lived
6	320	.0006		.96	Lived
7	352	.0006		1.06	Died
8	347	.0007		1.22	Died
9	345	.0007		1.21	Died
10	323	.0005		.81	Lived
11	309	.0007		.93	Died

M.L.D. of *Strophanthone Dilute* subcutaneously is .00060 mil per gramme body weight.

TABLE IX.

<i>Kombe Strophanthin</i> —Intravenous Administration.					
Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	384	.0000005	1-4000	.77	Died
2	485	.0000002	1-5000	.49	Lived
3	475	.0000003		.71	Lived
4	385	.0000004		.72	Died
5	493	.0000003		.74	Lived
6	340	.00000035		.95	Died
7	332	.0000003		.80	Died
8	340	.0000003		.82	Lived
9	338	.00000025		.68	Lived
10	312	.00000025		.87	Died

M.L.D. of *Kombe Strophanthin* intravenously is .00000035 gramme per gramme body weight.

TABLE X.

<i>Ouabain (Gratus Strophanthin)</i> —Intravenous Administration.					
Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	
1	376	.00000020	1-10,000	.75	
2	342	.00000010		.34	
3	354	.00000015		.53	
4	428	.00000012		.51	
5	463	.00000015		.69	
6	360	.00000020		.72	
7	407	.00000015		.61	
8	353	.00000020		.71	
9	322	.00000020		.65	
10	335	.00000015		.50	

M.L.D. of *Ouabain* intravenously is .00000020 g per gramme body weight.

TABLE XI.

<i>Tr. Strophanthus U. S. P.</i> —Intravenously Administered.					
Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	
1	544	.000020	1-50	.54	
2	532	.000040		1.16	
3	361	.000050		.90	
4	493	.000030		.74	
5	476	.000025		.59	
6	532	.000020		.58	
7	447	.000020		.45	
8	530	.000015		.40	
9	577	.000020		.58	
10	463	.000025		.58	

M.L.D. of *Tr. Strophanthus* intravenously is .000025 mil per gramme body weight.

TABLE XII.

<i>Strophanthone Dilute</i> —Intravenously Administered.					
Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	
1	550	.0003	1-5	.83	
2	413	.0005		1.03	
3	357	.0004		.71	
4	360	.00045		.81	
5	337	.00050		.84	
6	375	.00045		.84	
7	355	.00040		.71	
8	375	.00045		.84	

M.L.D. of *Strophanthone Dilute* intravenously is .00045 mil per gramme body weight.

TABLE XIII.

Summarized Results—Minimum Lethal Dose.					
Preparation.	Orally.	Subcutaneously.	Intravenously.		
1. <i>Kombe Strophanthin</i> .	.000045 gm.	.00000045 gm.	.00000045 gm.		
2. <i>Ouabain</i> .	.000020 gm.	.00000030 gm.	.00000020 gm.		
3. <i>Tr. Strophanthus U.S.P.</i>	.0020 mil	.000045 mil	.000020 mil		
4. <i>Strophanthone Dilute</i> .	.060 mil	.00060 mil	.000060 mil		

TABLE XIV.

Ratio of M.L.D.'s of the same preparation by different methods of administration.

Preparation.	Subcu. to oral.	Intravenous to oral.	Intravenous to subcu.
1. <i>Kombe Strophanthin</i> .	100 times.	128.6 times.	1.286
2. <i>Ouabain</i> .	66.6 times.	100.0 times.	1.515
3. <i>Tr. Strophanthus</i> .	44.4 times.	80.0 times.	1.818
4. <i>Strophanthone Dilute</i> .	100.0 times.	133.0 times.	1.330

TABLE XV.

Toxicity ratios of different preparations by different methods of administration.

Preparation.	Orally.	Subcu.	Intravenous.
K. <i>Strophanthin</i> to <i>Ouabain</i> .	0.44 times.	0.66 times.	0.515
K. <i>Strophanthin</i> to <i>Tr. Stroph.</i>	44.4 times.	100.0 times.	711.4
K. <i>Strophanthin</i> to <i>Strophanthone Dil.</i>	1333.3 times.	1333.3 times.	1285.7
<i>Ouabain</i> to <i>Tr. Stroph.</i>	100.0 times.	150.0 times.	125.0
<i>Ouabain</i> to <i>Strophanthone Dil.</i>	3000.0 times.	2000.0 times.	2250.0
<i>Tr. Stroph.</i> to <i>Strophanthone Dil.</i>	30.0 times.	13.3 times.	18.0

TABLE XVI.

Toxicity ratios for the same preparations, upon different animals.

Preparations.	Guinea-pigs, subcu.	Frog, subcu.
K. Strophanthin to Ouabain.	0.66 times.	0.5 times.
K. Strophanthin to Tr. Stroph.	100.0 times.	77.0 times.
K. Strophanthin to Strophanthone Dil.	1833.3 times.	1000.0 times.
Ouabain to Tr. Stroph.	160.0 times.	163.8 times.
Ouabain to Strophanthone Dil.	2000.0 times.	2000.0 times.
Tr. Stroph. to Strophanthone Dil.	13.3 times.	13.0 times.

The first twelve tables give a detailed account of each toxicity test and need no further comment. In the last four tables the results obtained have been summarized in different ways. A careful consideration of these tables serves to bring out several important and unusual facts.

In the first place, in Table XIV the great difference in degrees of toxicity of the same preparation when administered hypodermically and when given orally is clearly brought out. Thus Kombe Strophanthin and Strophanthone are 100 times as toxic when given subcutaneously as when given orally, and even Tincture of Strophanthus, which shows the least difference, is 44 times as toxic by the subcutaneous method as by oral administration. The increased toxicity by intravenous administration over subcutaneous dosage is very much less, being in no case over 1.8 times as toxic for the same preparation. It is thus apparent from this table of relative toxicities that the satisfactory therapeutic dose of any of these preparations for intravenous or subcutaneous use cannot be derived from the previously determined therapeutic dose for oral administration by the usual rule of giving $\frac{1}{2}$ to $\frac{1}{4}$ as much. With the ratios of toxicity subcutaneously to orally ranging from 100 to 44 times for the different preparations, serious results would be almost certain to follow the subcutaneous administration of one-half the therapeutic oral dose.

Hatcher⁴ first observed the marked difference in toxicity of strophanthin when given subcutaneously and orally. He accounted for this fact partly by saying that the excretion more nearly kept pace with the slow absorption following administra-

tion into the alimentary canal. He also advanced the theory that strophanthin may be partly destroyed in the alimentary canal. The view held by Cushny⁵ that because of the glucosidal nature of strophanthin the abnormally low oral toxicity is *largely* due to destruction of the strophanthin in the alimentary canal by the ferments of the digestive tract is a very logical and satisfactory explanation of the peculiar action of strophanthus. If this be true, the oral administration of strophanthus preparations is illogical and certain to cause confusing results, since the destruction and absorption will not be uniform. The absorption following hypodermic administration is much more rapid and certain, since there is slight opportunity for the destruction of the active principle. The greatest caution must be observed, however, particularly in the *intravenous* use of strophanthus preparations, that the dose is not too large.

Strophanthin for hypodermic or intravenous use is usually placed on the market in 1-mil ampoules of a 1-to-1000 solution. The activity of such a solution of the average Kombe Strophanthin, according to tests upon frogs, is just equivalent to that of Strophanthone Dilute in 1-mil ampoules. For intravenous administration .5 mil of such solutions should be large enough to produce the desired therapeutic effect.

Ouabain or Gratus Strophanthin has been recently recommended for hypodermic or intravenous use because of its purity and supposed uniformity. Recently published tests⁶ show a lack of uniformity in samples of ouabain, but the *average* activity is about twice that of Kombe Strophanthin (a statement first made by Gley⁷), and consequently it should be borne in mind that only half as large a dose should be given.

Table XV serves to show just how much more toxic Kombe Strophanthin and Ouabain are than Tincture of Strophanthus and Strophanthone Dilute by three methods of administration to guinea-pigs. It also shows how closely the relation is maintained in the different methods.

Table XVI gives a comparison of the

toxicities of the different preparations as determined upon frogs and guinea-pigs. The comparatively close agreement is rather remarkable.

CONCLUSIONS.

1. The subcutaneous and intravenous toxicities of the four strophanthus preparations tested are from 45 to 100 times as great as their oral toxicities.

2. It has been demonstrated that the satisfactory oral dose is not a true index of the potency of strophanthus.

3. To obtain the most uniform and satisfactory therapeutic results strophanthus

preparations should be administered hypodermically. Extreme caution should however be exercised in selecting a sufficiently small dose for subcutaneous and intravenous injection.

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CLINICAL NOTES ON VACCINE THERAPY.¹

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There is no more interesting subject for study than vaccine therapy. Its very history is interesting, and its practical import is so great that none of us can afford to ignore it.

We no longer have to visit the dead-room to ascertain that the patient has had pulmonary lesions which have healed. This is shown by the fluoroscopic screen and in the radiogram, and especially is this true in tubercular involvement of the bronchial glands. Calcareous and caseous deposits are frequently noted, showing evidence of previous infection, probably tubercular.

While this is merely a suggestion, specificity does not seem to be necessary in the production of immunity. I believe that future investigations will prove that non-specific protein—I would much prefer to think of bacteria and their products as albuminoid material or protein than as dead germs—can produce immunity. In some original work that I have been doing in the past year in one or two diseases, I think immunity has been produced by the use of non-specific protein.

So far as most practical workers are concerned to-day, the opsonic index is a dead issue. The laboratory man does not care to make such tests because they are insufficiently remunerative, and the practical field

worker has no need of them. Study of the patient will enable one to determine when to administer the second dose of vaccine.

The question of the protein molecule, the amino-acids, etc., is something which is not only interesting but most perplexing in its scientific aspect. In my opinion we have not yet even scratched the surface of the possibilities in connection with the protein molecule. We are just beginning to appreciate the fact that the blood itself is a "secreting organ," that the blood cells secrete an enzyme which has the power of dividing the protein molecules into finer atomic particles; nor do we appreciate all the rôles played by the red cells.

The basic feature in vaccine therapy is the negative phase of protein intoxication, for that is what you first secure when you administer bacterial vaccine; you overwhelm the individual with protein intoxication, and then say that the patient has a reaction, the so-called positive phase occurs. Thus we have action and reaction, which are equal and opposite, so to speak, in the law of physics, and the opsonic index rises above the normal. Then nature endeavoring to maintain a balance and equalize things, the index recedes toward the normal.

Practical experience demonstrates that we cannot always overcome infection with a single injection of specific or non-specific

¹Delivered before the Louisville Medical Club, of Louisville, Kentucky, December 15, 1916.

protein, and it may be necessary to administer the second or possibly the third dose. Following each injection the system to a certain extent acquires immunity to the influence of the protein, and therefore the next reaction is less, and so on until there is simply a reactive recession of the index. That is to say, it remains above the normal, and when that stage is reached it is time to discontinue the vaccine, because there has been secured an actual immunity.

Whence does immunity come? That is a tremendous problem. In some respects I believe we fall just a little short in our conception of what has been accomplished. We say the blood has acquired the power through an enzyme or something else to overcome infection due to that particular invading protein, whether it be the streptococcus, the staphylococcus, or what not; but it must be remembered that the liver is constantly destroying the blood cells, they are being disintegrated and eliminated from the system at the rate of many millions a day, and that the blood serum is being oxidized and consumed by the body tissues. Whence, then, does immunity really come? Is it from the blood?

I accept the proteo-morphic theory of Williams that immunity is granted by the action of protein upon certain organs—the bone-marrow, the lymph glands, the spleen, possibly the liver and the thymus gland; that this something we call immunity is granted these particular organs which make the blood cells. Each of these organs has something to do with the different cells which are manufactured and distributed by the blood stream, and confers upon the cell that enzyme, proteolytic or hydrolyzing power acquired by the action of the foreign protein on any of these organs.

Immunity, then, does not lie in the blood stream, or in the blood as a tissue, but lies in the organs which make the blood itself. If that be true, we might logically believe that non-specific protein may so influence this hemopoietic system as to confer upon these blood elements, not a specific immunity against any particular disease, but a heightened power against any foreign pro-

tein introduced into the system. This theory opens an absolutely new field of investigation, and if it proves true will enable the physician to prevent and cure many of the diseases which at present are resisting specific or attempted specific medication.

This subject has been of great interest to me during the last two years. I have spent many hours in study, reading, and experimental investigation, and while I am not yet ready to make any definite statement, I believe in a number of diseases I have demonstrated that there is an activity in non-specific protein, that its administration will promptly and satisfactorily relieve existing diseases, and that in patients known to have been exposed to disease it has granted immunity on inoculation. Therefore, it opens a tremendous field for all of us, and I hope in the course of a year to complete my work and publish the results, which have proven so far most interesting and satisfactory.

I desire to say in closing that certain infections may be as satisfactorily treated with stock as with autogenous vaccines, and these belong to the streptococcic, pneumococcic, staphylococcic, and mixed types. On the other hand, my studies lead me to believe that stock vaccines in the various colon bacilli infections are worthless. It is not the fault of the manufacturer, because there are so many strains of the colon bacilli (sixteen or eighteen have been identified) that it is impossible to tell which one predominates.

I have personally suffered from colon bacillus infection, and could not get relief until an autogenous vaccine was used. Since then I have experimented considerably with stock and autogenous vaccines in colon bacillus infection, and have secured practically no or only occasional results from the stock vaccine, but the autogenous vaccine has been exceedingly satisfactory.

Another infection in which in my experience little good is obtained from stock vaccines is that due to the bacillus pyocyaneus, but autogenous vaccines will be found satisfactory.

I never trust simply to clinical intuition

in determining the type of microorganisms present, but microscopically examine the discharge or other material available. Cultures are then made, and where it is deemed necessary autogenous vaccines are prepared.

The investigations of Wright have opened a most fertile and promising field, and the more you study the subject the wider the horizon becomes. The next step is in the line of non-specific proteins.

THE HEMORRHAGES OF PREGNANCY, INCLUDING PLACENTA PREVIA.

DAVIS in the *Medical Record* of May 19, 1917, asserts that where the placenta is over the internal os, the case is imperatively one for hospital. It were far better that all cases of placenta previa be treated in hospital, but under some circumstances those where the membranes are available may be managed in the patient's home, but central placenta previa as much demands hospital care as does ectopic gestation.

In the presence of this condition the obstetrician has his choice of several procedures. The first is that accredited to Braxton Hicks whereby the placental tissue is torn through, a foot of the child grasped, and the leg and breech drawn into the pelvic cavity and into the cervix. No effort is made to deliver, but the fetus is used as a plug to check hemorrhage. The life of the child is disregarded. Necessary stimulation may be administered, and no interference should be practiced until the uterus contracts. Spontaneous expulsion should be encouraged and awaited. Should this positively fail, however, cautious extraction followed by firm packing is indicated.

Of late years the intraovular or intra-cervical use of the dilating bag has been considerably tried. On the Continent obstetricians prefer to introduce the bag within the placenta, if possible, while those American obstetricians who employ the method are content to pass the bag through the cervix, expanding it against the placenta. As rapidly as possible the dilating bag is distended with fluid and the cervix dilated. Delivery may then be effected, rarely by forceps, usually by podalic version. The

question of immediate extraction will depend upon the condition of the child, the possibility for rapid and easy delivery, and the condition of the mother. This method has the danger of producing complete separation of the placenta and of requiring considerable time before the uterus can be emptied. Remembering the unusually softened condition of the cervix and lower segment in placenta previa, it is evident that great force must not be used in dilating. Perhaps one of the most dangerous things which can be attempted in obstetric surgery is the dilatation of the cervix in the case of placenta previa with Boss's dilator. This powerful instrument will tear such a cervix often into the pelvic cavity and rapidly bring about a fatal issue. The treatment with the bag is uncertain and hemorrhages may be concealed until the patient is in a grave condition.

The delivery of cases of placenta previa by vaginal Cæsarian section is not indicated, because of the unusually vascular condition of the field for this operation.

Abdominal Cæsarian section for placenta previa was advocated years ago by Bernays of St. Louis and by Continental obstetricians. Within the last five or ten years it has received considerable attention. Many American obstetricians limit its employment to cases of central placenta previa where the os is slightly dilated and the cervix firm and resisting, and the mother and child in good condition. The writer has enlarged these indications somewhat and for some time has treated cases of placenta previa in which the membranes were not readily available by abdominal Cæsarian section. In a series of 27 cases, 25 mothers have recovered and two mothers have died. All children in fairly good condition survived the operation. In operating, the uterus was turned out of the abdomen, rapidly emptied, and firmly packed with 10-per-cent iodoform gauze, the end of which was carried through the cervix into the vagina. While this was being done, from 20 to 30 ounces of saline solution were injected into a vein in the arm. Other stimuli were given by hypodermic injections.

EDITORIAL.

IMMUNE SERUM FOR POLIOMYELITIS.

Older practitioners will recall how impotent they felt in the presence of a case of diphtheria when they met it thirty years ago, and to-day they look back upon the only measures which they could carry out at that time as being woefully incompetent. The outbreak of poliomyelitis which occurred during the middle months of 1916 brought these facts to mind with considerable force, for during this outbreak the various measures which were employed seemed equally futile, and many of them did not profess to be curative but only symptomatic. It would seem that the introduction of adrenalin into the subarachnoid space, as proposed by Meltzer, possesses some value, but it is possible that the results which accrue from the puncture arise because of the abstraction of a certain amount of cerebrospinal fluid as well as through action on the part of the adrenalin itself.

From the first it has been hoped that some vaccine or immune serum might be developed which would enable the victim to make a successful fight against the disease. Of course in the fulminant cases there is little opportunity to use any remedy, even if it be specific, before the damage is done, but in a large proportion of cases the opportunity to employ an immune serum will exist, and, judging from our experience in regard to other infectious diseases, such an immune serum holds out more promise of benefit than any other measure which is in sight. At present it would seem that the source of this immune serum must be chiefly, if not entirely, derived from individuals who have survived an attack of poliomyelitis, for matters have not advanced to such a point that animals artificially immunized can be employed. The profession will therefore be keenly interested in some of the recent work which has been done along these lines.

In the *Journal of Experimental Medicine*

of April 1, 1917, Flexner and Amoss, in contributing a brief paper upon the "Passage of Neutralizing Substances from the Blood into the Cerebrospinal Fluid in Poliomyelitis," state that as far as present results can be interpreted the therapeutic value of immune serum is largely confined to the early period of the disease, corresponding with the onset, and that later on, when paralysis has already appeared and is extending, its usefulness is materially impaired, although not excluded, and they add, in the conclusions of their paper, that the blood serum on the sixth day of the disease contains neutralizing principles which will be of service if they are employed. Possibly the most noteworthy part of their communication is the statement that it is established for monkeys and rendered probable for man that the intraspinal injection of immune serum in poliomyelitis is curative. On the other hand, it would appear that the employment of normal serum is of no value.

In a paper which is more largely devoted to the clinical aspect of the matter, Amoss and Chesney contribute to the same issue of the *Journal of Experimental Medicine* the records of a considerable number of cases which have been treated by the use of immune serum. While the number of cases which they have had is not large, amounting to only twenty-six, nevertheless they feel that they can conclude that the serum, when introduced intraspinally under suitable conditions, is harmless. When introduced it should always be employed by the gravity method rather than by the use of a syringe. It is essential that the serum to be injected shall be free from corpuscles or hemoglobin, or, in other words, only perfectly clear and colorless samples are to be employed, since the introduction of corpuscles or hemoglobin is equivalent to the passage into the subarachnoid space of foreign substances.

Returning to the matter of the introduction of the serum by gravity, it is pointed out

that in acute poliomyelitis the lumen of the blood-vessels is early encroached upon by perivascular infiltration, which, in turn, interferes with the nutrition of vital cells. If the pressure of the cerebrospinal fluid is, therefore, materially increased damage is done, and to avoid any increase in pressure it is essential not only that the gravity method shall be used, but also that a greater amount of spinal fluid shall be first removed than the quantity of serum which is to be injected. If symptoms of increased intracranial pressure arise they are to be removed at once by prompt withdrawal of the fluid.

In their studies the time limit which they consider as equivalent to early treatment was set at forty-eight hours after the onset. Out of their twenty-six cases eighteen were treated within this time. The best results being obtained in those patients which received the treatment within thirty hours after the onset, although beneficial results were obtained in one case as late as ninety-six hours after the beginning of the illness. The serum which they employed was obtained from persons recently recovered from poliomyelitis, at which period it is supposed to contain immune substances in greatest concentration, and they believe that if serum can be obtained only from patients whose attacks are more remote correspondingly larger doses should be employed.

From these and other experiments it would appear that the use of immune serum early in the disease is not only advantageous in the sense that it serves to protect before great damage is done by the infection, but also because it serves to bridge over the period during which the patient is developing his own immune bodies, since not until the sixth day of the disease are these immune bodies present in readily detectable quantities in the blood. Another advantage is that the intraspinal injection results in bringing the immune substance in direct contact with the diseased area with promptness, whereas those immune substances which are naturally developed in the blood have first to pass

through the meninges and the choroid plexus in order to reach the damaged nervous tissues. Nevertheless, in urgent cases both intraspinal and intravenous injections should be practiced.

Concerning the dose of the serum, Amoss and Chesney found that those patients who received a total of more than 30 Cc. within forty-eight hours after the onset, without regard to the clinical condition, age, or temperature, seemed to be benefited in every case but one, and in this case the temperature quickly dropped to normal. They therefore think that it is highly desirable to administer at least 50 Cc. of serum in every case, and if possible to treat the cases within thirty hours after the onset of the first symptom. The first proposition is not as difficult as the second. As the result of their clinical observations, which were primarily based upon experiments of a laboratory nature, they conclude that immune serum from recently recovered cases of poliomyelitis probably yields the best results that can be obtained to-day, and that if this serum is sterile, as to ordinary bacteria, and free from corpuscles and hemoglobin, it may be employed without danger, if it is injected by the method already described when used intraspinally, and also that it may be used intravenously. In some cases it is also advantageous to use it subcutaneously.

As would be supposed, they found that the action of the serum seems to be more effective in arresting paralysis than in rapidly bringing about its retrogression. Their investigations have not gone far enough to enable them to determine how frequently the injections should be repeated, but they believe, in those cases in which some degree of muscular weakness develops soon after the first injection, a second injection twelve to twenty-four hours later may be advantageous. Possibly, too, the temperature curve may serve to indicate the time for reinjection.

Apparently, at the present time, we are in the position of seeing much promise in this method of treatment, which is crude as yet, and which is largely limited by our

inability to obtain immune serum from animals. It is to be hoped that further laboratory investigations as to the character of the disease will before long enable us to obtain an immune serum from animals in large quantities. It would appear, too, that the early diagnosis of the disease in future is to be reached rather by examination of the cerebrospinal fluid, obtained by means of spinal puncture, than by the observation of ordinary symptoms.

As is well known the onset symptoms in acute poliomyelitis differ greatly in degree and kind. They may be fulminant or so mild as to escape notice, and as successful treatment, so far as the use of immune serum is concerned, must be instituted early if it is to be successful, an accurate diagnosis at the onset is most important. For this purpose spinal puncture has been and may be employed, but it ought not to be resorted to unless there is no other means of gaining additional information as to a correct diagnosis of the condition which is present, because it has been pointed out by Flexner and Amoss that the act of puncture may provide an opening through which the virus of the disease may pass from the blood stream into the central nervous tissues and so aid the spread of infection. On the other hand, if spinal puncture is decided upon there are a number of facts to be considered, although there is nothing in the spinal fluid which is characteristic, or pathognomonic, about it. As a rule the fluid is under slightly increased pressure, is clear, or faintly opalescent, and only becomes turbid late in the disease when paralysis has developed. If small amounts of blood are present and the physician is confident that this blood did not enter the fluid as a result of puncture the blood may be considered as evidence that severe poliomyelitis is present. It is in cases of polioencephalitis that it is most important to differentiate between this disease and meningitis due to the meningococcus, pneumococcus, tubercle bacillus, or other organisms. In meningococcic and pneumococcic meningitis there is a very high cell count. This, however, is also true of the fluid in polioencephalitis, but there is

this marked difference, that in polioencephalitis the cells are almost invariably mononuclear, whereas in the other two conditions they are polymorphonuclear. So, too, in these conditions there is prone to be a greater amount of albumin in the fluid, and the sugar in the fluid is decreased or absent, whereas in polioencephalitis Fehling's test shows the presence of sugar. In these conditions, too, particularly in the meningococcic infection, the fluid is apt to be cloudy or opaque, and the examination of it under the microscope shows the intracellular organisms. In tuberculous meningitis the fluid is always clear, and while the cell count is high the characteristic cell is a small lymphocyte. Kollmer thinks that there is greater quantity of albumin present in the fluid of poliomyelitis than in tuberculous meningitis, but the variation in protein content is not sufficient to be of much value. It is important always in examining the fluid microscopically that the examination be made promptly after its withdrawal.

QUININE IN SEVERE MALARIAL INFECTIONS.

There is probably no subject of greater interest to a large number of practitioners in all parts of the world than the one with which this article deals, unless it be the consideration of the treatment of tuberculosis or syphilis. We have from time to time called attention to the opinions of men who have had large clinical experience in the treatment of malaria in the tropics by the use of quinine and other remedies, and we have discussed the question exhaustively as to whether quinine should or should not be used in the presence of malarial hematuria and hemoglobinuria.

We have also considered at various times the advantages and disadvantages of the hypodermic injection of quinine, either as a curative agent or as a prophylactic, and have pointed out that in India it has been found that such injections seem to predispose in some cases to the development of tetanus, even when the solution injected and the needle and syringe were absolutely

sterile, probably because tetanus spores, already in the body, found a favorable place to develop where the quinine induced peculiar changes in the tissues.

We have also pointed out that when quinine is used hypodermically it should be given into the belly of a muscle, and not into the subcutaneous tissues, in order that it may be promptly absorbed and that it may not cause a slough. Last of all we have considered the important question of the value of so-called prophylactic doses of quinine in persons exposed to malarial infection, and pointed out that such doses frequently result in the development of an immune strain of the parasites, which rapidly mature when the patient stops taking quinine, and which is so resistant to the drug that even full doses may fail to cure. This view is thoroughly upheld by Michael, who contributes an article upon "Quinine and Malaria" to the *U. S. Naval Medical Bulletin* for April, 1917, and who believes that while quinine has an important place in malarial prophylaxis, only second to personal protection against the mosquito, the best method is the administration of three large doses whenever there is the slightest symptom of the presence of the disease, as, for example, fifteen grains of quinine are given at noon, twenty at night, and fifteen the following morning. This treatment is given at intervals of one week, and each course is preceded by a purge.

Attention has once more been directed to the subject of the best means of giving quinine by an interesting and valuable article contributed by McLean, surgeon in the U. S. Navy, to the *U. S. Naval Medical Bulletin* for April, 1917, in which he discusses the intravenous administration of concentrated solutions of a soluble salt of quinine in malaria and hemoglobinuric fever, the opportunity for his observations having been afforded by an outbreak of malaria and blackwater fever among the U. S. marines in Haiti during the spring of 1916. The hospital ship *Solace* was ordered there to study and combat this epidemic, and remained there from June 2 to September 4, during which time thirty

cases of malaria and six cases of blackwater fever were received. Three of the blackwater fever cases were convalescing when they came on board, and while the urine was free from hemoglobin, blood cells, and bile pigment, they were still running slight daily temperatures. The other three cases showed hemoglobin only fourteen hours before, were in the acute stage of the disease, and the blood of one of these cases showed a small ring-form infection. Most of the thirty cases were infections with benign tertians, but in five of them the malignant tertian organisms were found.

The point of chief interest in this report is the use of quinine in concentrated solution, one grain to one mil of sterile water, intravenously, which was suggested to Dr. McLean by Dr. Spear, another naval medical officer, while the ship was at Guantánamo Bay a year previously. About four hundred intravenous injections, using the concentrated solution named, have been given on board the *Solace* with excellent results without a single unfavorable reaction or the slightest indication of danger, even when the patients were very anemic, weak, and cachectic in appearance.

Heretofore the fact that quinine when injected in full dose into a vein is prone to act as a cardiac depressant or has seemed to cause hemolysis, has made most clinicians fearful of administering it by this route, but careful daily urinary examinations failed to reveal any evidence of hemolysis. So, too, systematic blood examinations at regular intervals failed to show at any time the slightest indication of damage to the red cells; on the contrary the red-cell count showed an early increase in all cases after very few injections. Thus, one patient who showed 3,700,000 reds and hemoglobin seventy per cent received daily intravenous injections for over one month, although the temperature remained normal after the third day, and at the termination of his treatment his reds were increased to 5,200,000, and the hemoglobin practically normal, thereby confirming an observation, made by the writer of this note many years ago, that quinine distinctly increases the number of red blood

cells. McLean admits that in carrying out his treatment he went contrary to the instructions and cautions given in most text-books on tropical medicine, particularly in the free administration of quinine intravenously in hemoglobinuria, but he makes the important additional statement that, while these injections were made regardless of the time or stage in the disease, proctoclysis, sodium bicarbonate, and saline transfusion was used in conjunction with it to counteract dehydration, acidosis, or decreased urinary elimination due to excessive and continued vomiting. He states that the hemoglobinuria cleared up within sixty hours after the first treatment, and the febrile temperature, which had been present for weeks, dropped to normal in two or three days.

So good were the results that five of the hemoglobinurics were returned to duty in the tropics. The solution employed consisted in one grain of chlorhydrosulphate of quinine to each mil of sterile water, and ten mils, that is the equivalent of ten grains, were injected at each dose, although sometimes as much as fifteen grains were given. After the solution is made it is filtered, placed in autoclave at fifteen pounds for twenty minutes, and when cooled is ready for use. A fresh solution should be made each day. The method of administration consists in painting the skin over the forearm with iodine tincture, placing a rubber tourniquet about the arm, introducing the needle through the skin into a vein, and connecting the needle with the syringe, which has been previously loaded. The tourniquet is released and the injection gradually given. Of course, all ordinary aseptic procedures should be adhered to.

The symptoms immediately observed by the patients consist in a moderate burning sensation in the throat, followed by a slight cough and sensation of warmth in the lungs, which quickly passes to all parts of the body, giving the sensation of a fever. Quickly following this there is some dizziness and occasionally a very mild, transient syncopal attack, which leaves slight dizziness lasting for about five minutes, after

which the patient is able to get up and go about. The pulse is slightly quickened. Nausea and headache are rarely present. The patient is usually given an injection sitting in a chair, and then made to lie down for ten minutes. Usually two injections a day are given, at 9 A.M. and 7 P.M., for four or five days, and then, for ten days, once a day. Quinine is not used by the mouth. McLean claims that this method of using concentrated quinine solution is better than when large quantities are given, since the small quantity of water employed is less apt to produce reaction. If we mistake not, a number of observers are in accord with this view. McLean has had unfortunate results with intramuscular injections, namely, abscesses and painful lumps, particularly in debilitated patients. When giving intramuscular injections some clinicians drive the needle through a small piece of rubber dam placed on the skin in order to get rid of any quinine solution which may be on the outside of the needle.

For the reasons given above McLean reaches the following conclusions:

1. In malaria and blackwater fever the use of concentrated solutions of quinine intravenously is the method *par excellence*.
2. Quinine intravenously should be given in concentrated solutions—i.e., 10 to 15 mils—and not in dilute solutions of 200 and 300 mils.
3. Under ordinary precautions and sterile technique the concentrated solution is practically free from danger.
4. As regards systemic reaction it has many advantages over the dilute solution.
5. In results this method has many advantages over any other method of giving quinine in malaria.
6. In some cases the use of the dilute solution is dangerous.
7. The intramuscular method has many objectionable features.
8. By the use of concentrated solutions the attack can be cut short and terminated, the patient saved much suffering and discomfort, and in a military service much saving of money, time, and services to the government can be made.

9. The results obtained are sufficient to make one feel that it is not only a safe method, but by far the quickest and surest way of eliminating the malarial organisms from the system.

In another article contributed to the *U. S. Naval Medical Bulletin* for April, 1917, by Torrance and Bowman, of the U. S. Navy, they discuss the question of the use of quinine in malarial hemoglobinuria, so-called, and report cases to support their views in favor of its employment. The nausea which is so commonly present in persons suffering from malaria makes the use of quinine by the mouth disadvantageous. Intramuscular injections are inadvisable because they tend to the possibility of tetanus. They believe that absolute rest in bed is essential, in the use of calomel followed by a soap-suds enema, and that large quantities of water containing thirty grains of sodium bicarbonate to the pint are indicated, or, if vomiting prevents this, the use of the Murphy drip. Caffeine seems to be a useful stimulant, and hot fomentations applied over the kidneys may be advantageous. They believe that quinine is superior to salvarsan, and that it is far better to run the chances of the slight hemolytic action of quinine than to risk the enormous destruction of red cells caused by the rapidly multiplying malarial parasites.

THE TREATMENT OF CHRONIC INTESTINAL STASIS.

Members of the medical profession, like all other human beings, naturally follow men who, because of ability, devise new or modified plans of treatment for conditions which have heretofore failed to completely respond to older therapeutic procedures. The fact that the method of treatment is distinctly novel seems to possess a charm which they cannot resist, yet the general practitioner should regard novel and new plans of treatment with sufficient distrust to make him cautious in resorting to them; although, on the other hand, it may be well said that he who is unwilling to take up

everything that is new and which seems to possess value will soon be left hopelessly in the rear, both as to his own mental and as to his practice.

Surgical procedures, from one point of view, when novel are prone to be more radical than medical procedures, but we fear that both medical men and surgeons sometimes discard the old for the new hurriedly, and surgical practitioners are sometimes prone to show what surgery can do rather than what it ought to do.

For a number of years the subject of intestinal stasis has been prominently before the medical profession. For a long time after Glénard pointed out its importance in association with enteroptosis failed to receive the attention which it deserved, but comparatively recently it has been treated by various measures ranging from mineral oil to Lane's very radical advocacy of excision of part or all of the large bowel. On two occasions we have published the opinion of Clark as to the very limited usefulness of Lane's operation; indeed, it is a question as to whether in any field of usefulness except under the most extraordinary conditions, for it does the patient little good to be deprived of his colon and become a sufferer from chronic diarrhea, instead of intestinal stasis, with all the additional abdominal discomforts and illness which necessarily follow such radical interference with the physiology of the digestive tract, if the patient is fortunate enough to recover from the surgical procedure itself.

The use of the *x*-ray has, without doubt, enabled us to discover intestinal stasis and enteroptosis as causes of other symptoms which have hitherto been obscure in origin, but even at the present time it would appear that the *x*-ray plates showing marked displacement of the colon are not to be relied upon as indicating that such a condition is anything more than a peculiarity of the patient who is being examined, since certain patients who have such displacements have no intestinal symptoms, near or remote, and it is quite possible that in some *x*-ray reports the colon may have been out of place

the moment, and yet was capable of performing its function perfectly. In many instances the use of a proper diet, proper laxatives and tonics, the use of a supporting belt, or of supporting adhesive strips, will do all that is necessary, and even if perfect recovery is not attained the patient will be better off than if he submitted to a radical surgical operation. It is probably true at the present time that certain cases of intestinal stasis and enteroptosis are overlooked because marked relaxation of the abdominal wall does not call attention to their probable condition, and it is quite remarkable how in some of these cases the use of proper abdominal support and other measures will benefit the patient. Certain it is that operative interference for these conditions ought not to be resorted to until every other measure has failed.

A useful article dealing with this matter has recently been contributed to the *Interstate Medical Journal* by Hayes, who points out that intestinal stasis is responsible for a large number of cases of disturbed digestion of the chronic type. However much Lane may be mistaken in the radical measures which he advocates from the surgical standpoint, his grouping of cases of chronic intestinal stasis is nevertheless wise. The first group, amounting to about ninety per cent, he thinks is suitable for medical treatment; the second group needs active surgery for the breaking up of bands and the relief of kinks; and the third group, or the severe one, which requires a short-circuiting operation or colectomy.

So far as the first great group is concerned it is manifest that raising and holding the abdominal viscera in approximately the normal position is the essential element to be sought, as well as medicinal measures designed to regulate the bowels to moderate peristaltic movement in the small intestine. In many cases it is also necessary to correct the secretory and motor function of the stomach and check putrefactive changes and fermentation in the intestine. The first condition is to be relieved by laxatives and the second by tonics and digestive agents, the putrefactive changes to be corrected by

the use of the Bulgarian bacillus, and the excessive fermentation by intestinal antiseptics in the class of drugs. So, too, putrefactive changes are to be corrected by excluding, or cutting down, proteins from the diet, and fermentative changes by diminishing the starch intake. Certain exercises designed to strengthen the abdominal muscle are also advantageous. In certain cases with marked stasis massage of the abdomen is an excellent therapeutic measure. For keeping the feces soft mineral oil is advantageous, and cascara, phenolphthalein, or agar-agar may be used as laxatives. Occasionally it is wise to give Carlsbad salts when first awakening in the morning, or to use some other active saline, and it is important in many of these cases that the solution should be hot and not cold. So, too, an outdoor life and a degree of exercise which does not proceed to exhaustion, but to moderate fatigue, is essential in that it establishes nervous and muscular vigor.

THE CO-OPERATION OF PHYSICIAN AND SURGEON IN THE AFTER- TREATMENT OF PATIENTS.

Under this or similar heading many papers have been written pointing to the evils which befall a surgical case attended unaided by the medical man, and the equally distressing evils which befall him who is truly medical when treated by a surgical man. The unfortunates in the latter case are comparatively few since the surgeon does not largely occupy himself with those who either really, or in his mind, do not give a fair promise of benefit from some form of operative intervention. The surgical cases in the exclusive hands of medical men become fewer, incident partly to the increased skill of surgeons, partly to popular education, and mainly to the greater diagnostic ability of the internists of to-day.

The discussion concerning coöperation of the two branches of the profession has had to deal in the past mainly with that period of time preceding operation. Therefore it is somewhat novel and highly desirable to

have some light thrown upon the fate of the patient who has been first treated by an internist and afterwards by a surgeon following operation. This matter is taken up by Goodman and Speese, representing respectively medicine and surgery (*Pennsylvania Medical Journal*, May, 1917). They note that the usual plan followed in many hospitals after a patient has been transferred from the medical to the surgical side is for the physician to efface himself from all relationship to the patient, this particularly among ward patients, and they raise the question as to whether the physician who transfers the patient for a serious surgical procedure should complacently believe himself to be free from further responsibility or should share with the surgeon many of the difficulties arising from the postoperative care of the patient. They hold that the proper diet for a patient who is undergoing an operation for a gastrointestinal condition is determined only by consideration of the morbid process, the type of operation, the individual's idiosyncrasy toward certain foods, and his gastric and intestinal chemistry. They therefore contend that the routine of prescribing liquid, semiliquid, soft, select, house, or whatever the diets are named in the various hospitals, to all patients regardless of the gastrointestinal condition is most undesirable. Moreover, many of these patients require as much attention from the dietetic as they do from the surgical point of view.

It is unfair to the patient to discharge him from the surgical ward, believing him to be cured, and neglect to instruct him as to his mode of living for the ensuing twelve months or even longer. It is stated that comparatively few cases of duodenal ulcer are immediately relieved by operation, and that, if the surgeon could have an opportunity of seeing these cases immediately following the operation, he would be chagrined at the patient's recital of his physical troubles. Gastric and duodenal ulcers are acute conditions in which postoperative success is frequently wanting. While appendectomy, gallbladder operations, resections, plastic operations on the stomach and intestines are

operative procedures from which immediate benefit may be secured, the ultimate are largely influenced by continued medical care.

No patient is really cured at the end of a month's sojourn in the hospital, after going an operation for any abdominal surgical condition. For a long time during reconstruction or readjustment period should be regarded as a patient and not as such; the burden should be borne equally by the family physician. The patient should be required to report at regular intervals to his physician, even though he believes himself to be in perfect health.

If the case be one of gastroduodenal ulcer, as long as blood is present the ulcer should be treated as an ulcer case. If the blood has been absent and again reappears, the above holds good. Hamburger and others have strongly accentuated the fact that relief through surgical interference in gastric and duodenal ulcer is due to a lack of properly placed surgical indications; thorough and prolonged preoperative medical treatment; failure to devise the proper surgical procedure to meet the individual case, and lack of prolonged postoperative medical treatment.

Lichty states that in nearly 10 per cent of his cases referred to surgeons the symptoms were present after operation, before, and that some of these results have been avoided if there had been adequate and supervision of the patient on the part of the medical man after operation.

THE FIRST DRESSINGS FOR WOUNDS.

Since on the first dressing applied to a wound depends so largely its subsequent course and the fate of the human unit, it is strange enough to have been injured, it is strange that neither war nor accident experience has yet enabled a group of intelligent men to unanimously agree on any one particular form of first aid to wounds acquired in industrial establishments, often not largely infected, and

wide open, and treated by skilled surgeons almost immediately, may very properly have applied to them as an immediate protector against further contamination dry sterile gauze secured in place by a bandage. To war wounds inflicted by bombs and bursting shells, always devitalized, often tremendous in extent, and practically always and deeply and virulently infected, the application of dry sterile gauze firmly secured in place by a bandage might be admissible were it promptly removed, the wound cleansed of foreign bodies, made accessible in its deepest parts to antiseptic washes, and subsequently either continuously laved by an antiseptic solution, at the present writing preferably the Dakin, or adequately and completely drained. Dry sterile gauze placed on such a wound and retained for hours, perhaps days, is certainly in many cases not only futile, but absolutely harmful, acting as a plug to retain infection under pressure and becoming a contributing factor to subsequent complications such as gangrene, hemorrhage, and general septicemia.

The underlying principle of all first dressings, certainly in military surgery, is to the effect that each soldier should have one, should part with it to no other, and should immediately apply it to himself or have this done by a comrade. The first dressings supplied to the troops vary. There is surely a best, and probably this best is not to be found at any front. As a part of the medico-military preparation for the part which our own men shall take in settling this conflict, the study of the best first dressing is of vital importance. It must obviously fulfil certain conditions.

1. It must not seal against drainage.
2. It must be protective against further contamination either by contact or through the medium of insects.
3. It should be strongly antiseptic, but neither toxic nor devitalizing to lesions.
4. It must occupy comparatively small

space in the soldier's outfit, must be so secured to his accoutrements and sealed that it can neither be lost nor used for purposes other than those intended. It must be sealed against dirt or the loss of its antiseptic powers.

The form of this package and its constituent parts should be determined promptly by an intensive study utilizing for this purpose the material afforded by the great industrial plants and the skilled surgeons in charge of them, and the large accident clinics in our great hospitals. When the apparently ideal first dressing is determined upon, it should be used by troops now fighting in the front.

Various trials and comparisons made with iodine, with sterile gauze and carbolic acid have proven nothing; this possibly because the fundamental principle of drainage, or at least freedom from tension, has not been observed in the trials of these first-aid packages. There are certain new and powerful antiseptics, some of which are neither destructive to living tissues nor materially interfere with phagocytosis. Among them may be named Dakin's latest preparation dissolved in eucalyptus oil and properly weakened by paraffin oil; Schamberg's mercuraphen, non-toxic, comparatively unirritating, and experimentally far more potent than bichloride; and flavine. Nor is the soap dressing without its warm advocates.

Bull's recent work with the gas bacillus and his demonstration of its toxin or toxins and his elaboration of the antitoxins, which in laboratory trials have been entirely efficient, give at least a promise that this menace to the wounded may be lessened if not entirely removed.

If each man in the American army can carry with him a first-aid package, which instead of complicating the further course of his wound makes its healing more prompt and assured, he will have given an example of medical efficiency greatly to the credit of our profession.



REPORTS ON THERAPEUTIC PROGRESS.

TWILIGHT SLEEP.

The Prescriber for April, 1917, states, what we in this country well know, that the application to obstetrics of scopolamine-morphine anesthesia, under the popular though inaccurate title of "twilight sleep," has been so freely referred to, and so enthusiastically "written up" by the lay press, that patients are demanding of their medical men to have it. Like all popular movements there is a certain value in the method, but it has been clearly demonstrated by this time that while it has its place, it is not to be used as a routine method. In the first place it appears to be untrustworthy; it acts beautifully in some cases, and is of very little use with others. Secondly, it is most dangerous to the child if the latter be born while there is still plenty of narcotic in the maternal blood stream. It may require prolonged artificial respiration to bring the child to life. Thirdly, it abolishes memory rather than pain; that is to say, the mother suffers, or may suffer, just as much as with the older methods, but she remembers nothing about it.

In connection with this last feature, we would quote from a letter recently received from one of our readers, a medical practitioner in the Midlands. "A mother discussed with me," he says, "the price of coals and many other things. Told me each time she had a pain, and that the injection had not relieved her of her pain. She showed natural anxiety when the baby had to be roused by artificial respiration. Next day, however, she knew nothing about the events of the previous afternoon, not even at what time I had called to attend her. Naturally, she thinks that she had a splendid time, felt nothing, and so forth. Now she is advising all her friends to have 'twilight sleep.'"

A valuable symposium on the subject of "Twilight Sleep" appeared in the *Practitioner* for January of this year and was abstracted for the THERAPEUTIC GAZETTE. The contributors were all obstetricians of wide experience, and most of them regarded

the loss of memory as the primary aim in the treatment. One writer emphasized the necessity for purity and stability of the drugs used. Sir H. Croom said that he has not met with contraindications, nor with any harm either to mother or child, either in hospital or private practice, but this is not the experience of others. On the whole the method appears to be justified in some cases, and its action is by creating amnesia. Mr. J. S. Fairbairn, one of the contributors referred to, said that it requires constant watching of the patient by nurses and frequent visits by the physician. "Indeed," he adds, "the requirements are such that it would probably be advisable for the patient to go to a nursing home within easy reach of her medical attendant. It certainly involves great increased expense to the patient, and it appears that the induction of the so-called 'twilight sleep' will be a luxury only for those willing to pay for it."

THE TREATMENT OF PERNICIOUS ANEMIA.

LARRABEE in the *Boston Medical and Surgical Journal* of April 19, 1917, including an article on this topic admits that it is still unfortunately true that we do not know the cause of pernicious anemia, and that we must still regard it as invariably fatal. We have, however, learned much concerning its pathogenesis. We can employ various methods to give its victims a measure of relief and a little longer span of life. There is no one measure or method of treatment that is always indicated in every case. We must, at any moment, choose for the case in hand the measure best adapted to meet the indications of the moment. So far as we can speak of a systematic treatment, it is in the writer's opinion something as follows:

Every case should receive arsenic administered continuously by the mouth.

Wassermann reaction is positive or if there is other evidence of syphilis, salvarsan should be used. Iron should seldom be given except during recovery from relapses, and the increase in red corpuscles out-weighs the increase in hemoglobin and the x-ray picture approaches that of benign anemia. The diet should always be carefully regulated with a view to controlling protein putrefaction and intestinal indigestion and preserving the nutrition. Hydrochloric acid and other aids to gastric digestion should be used freely. When the anemia is rapidly increasing the careful use of cathartics and regular and thorough lavage of the colon and perhaps also of the stomach is in order. If the anemia still progresses, and especially in hemorrhagic and aplastic states, transfusion, best by Linton's tubes, should be done. If one or more transfusions are not followed by remission, it is justifiable to remove the spleen.

ABDOMINAL KNEADING IN THE TREATMENT OF INTESTINAL STASIS.

LINTON in the *British Medical Journal* of March 31, 1917, points out how important it is to prevent the stasis of food in the large intestine through the use of purgatives such as paraffin, and the popularity of the treatment for washing out the large bowel; nevertheless it is to supplement these remedies that abdominal kneading is recommended.

The patient, after being carefully instructed, can carry out this treatment for himself. Lying in a warm bed, in a comfortable position on the back, so as to relax as far as possible the abdominal muscles, the patient must place both warm hands, with fingers flat, upon the abdomen over the position of the cecum. Gentle but firm pressure must now be made, gradually getting deeper and deeper as the muscles relax and the contents give way. The pressure must be made backward and upward, and must be continued at this spot for at least two minutes. The contents cannot be easily pushed back into the small intestine, and

will therefore be impelled forward. The hands, still pressing deeply, are made to follow the contents up the line of the ascending colon.

The next movement has for its object to assist the passage round the hepatic flexure. For this purpose the fingers of the right hand are placed at the right loin, in the cleft between the lower ribs and the hip-bone, and pressed firmly forward. The left hand is placed at a corresponding spot on the front of the body and pressure brought to bear so that the bowel is squeezed between the two hands and emptied of its contents. The pressure may be relaxed and repeated several times. The gall-bladder must now be manipulated. The tips of the fingers of both hands are forced under the ribs at the position of this viscus and pressure brought to bear upon the fundus. A very efficient instrument for this treatment of the gall-bladder is the electric vibrator.

Deep kneading is now applied over the transverse colon, pressing toward the spleen. The splenic flexure is treated in the same way as the hepatic, but it is far less important. Indeed, the only other important part to treat is the sigmoid flexure, and here the pressure must be exerted downward. The patient should treat herself after getting to bed at night and again before rising in the morning, spending fifteen to twenty minutes in the process. Steady pressure and great patience are necessary if any success is to be obtained. Much of the treatment recommended can be carried out by the use of a heavy ball of shot, which is very slowly rolled over the abdomen following the direction of the large intestine.

The most obvious effect of the kneading is the passage of flatus, which usually occurs while the treatment is in progress. This is frequently followed later on by an action of the bowels.

In deciding what cases require this treatment, one naturally thinks first of constipation, biliary catarrh, and dyspepsia. But intestinal stasis is often present where it is not suspected, and a careful examination of the abdomen should be made in every

case of chronic illness. It may be at once obvious on inspection that the right side of the abdomen is more distended than the left. Through the parietes of elderly women elevations can sometimes be seen showing the position of lumps of hardened feces beneath.

Palpation will clear up any uncertainty in the diagnosis. Of 156 patients in whom the abdomen was examined at the Electro-medical Hospital, Nottingham, tenderness over the cecum was present in one-third. Most of these were suffering from some form of rheumatism or from neuritis. In many the tenderness disappeared after a short course of treatment, and in none did any harm arise from the kneading and electricity applied.

In elderly persons in whom the tone of the muscular fiber is lost, difficulty is experienced in bringing about a healthy action of the bowels; they suffer from chronic retention, and when the bowels are relieved by purgatives there is inability to retain the liquid motion. For these cases abdominal kneading with electricity is useful.

Many persons in ordinary health are subject to occasional attacks of heaviness or depression. They arrive at their office only to find that the head is not clear and work is an effort. In the course of an hour the head will become clear and all the unpleasant depression pass away. Early morning headache is caused by poisons absorbed from the abdomen, and is relieved by kneading, even when there is no constipation. Diarrhea is due in many cases to fermentation in the cecum. The overflow gives the mistaken impression that there is no stasis. Kneading is often of service in this condition. No case of mucous colitis should be considered incurable until kneading has been thoroughly tried, while paraffin is being given internally.

A very troublesome condition, often accompanied with much pain, is that due to adhesions following operations on the abdomen. Kneading, with radiant heat and electrical treatment, will bring about a good result if persevered with.

It is not in chronic diseases only that this

treatment is useful; the doctor called in to an emergency case of flatulent colic can relieve his patient in a few minutes by this method.

THE ACTION OF STRYCHNINE IN CERTAIN TYPES OF CARDIAC IRREGULARITIES.

In the *Journal of Pharmacology and Experimental Therapeutics* for April, 1917, M. I. SMITH reaches the conclusions from laboratory investigations:

1. Strychnine is shown to have depressant action upon the excised heart of the frog and the rabbit. It slows the rate, and lessens the amplitude and irritability of the heart.

2. Strychnine in sufficient concentration may delay or prevent the irregularities produced in the isolated heart by aconitine, by ouabain, and by occluding certain branches of the coronaries. This is shown to be due to strychnine lessening the enhanced irritability of the heart which gives rise to such irregularities.

3. Irregularities arising from impaired conductivity (cocaine irregularity) or from excessive depression of the myocardium (apocodeine and ergotoxine irregularities) are aggravated by strychnine.

4. It is suggested with the greatest reserve that strychnine may have a place in the therapy of ectopic beats originating in the ventricles.

A REVIEW OF ANESTHESIA IN OBSTETRICS.

In the *Long Island Medical Journal* for April, 1917, POLAK and MATTHEWS publish an exhaustive review of this subject and state that the following conclusions may be formulated:

1. It must be admitted that the ideal obstetric anesthesia has not been discovered.

2. The prolongation of the second stage of labor by any method is disastrous to the child, and this is particularly true of the morphine group of drugs.

3. Various combinations of the drugs at

our disposal for the production of obstetric anesthesia have certain definite advantages, *e.g.*, pantopon with scopolamine, or morphine with scopolamine to carry the patient through the preparatory stages, and when it seems necessary, chloroform, ether or nitrous oxide gas during the perineal stage.

4. At the present time, morphine-scopolamine anesthesia for the first stage and nitrous oxide gas for the second stage of labor, would seem to be the best combination.

5. From a study of this subject, it would seem that institutional obstetrics must be accepted as a recognized specialty, and that the judicious use of anesthesia, though not without its dangers, is destined to be classed among the obstetric arts.

RESUSCITATION OF APPARENTLY DEAD INFANT.

To *Northwest Medicine* for April, 1917, COUCHE contributes this report:

Last summer he was called to attend a case of midwifery. He got there five minutes after the baby was born and found the cord had been prolapsed for fifteen to twenty minutes before birth, and the babe was apparently dead, eyes rolled back, and no sign of heart-beat by careful auscultation.

He immediately whipped out his hypodermic syringe and gave the child one-half Cc. of pituitrin in the left hip, followed by immersion in a bath of warm water up to the chin, and commenced traction on the tongue. In fifteen minutes he listened to chest and heard the heart give a distinct impulse. Fifteen minutes later he gave it $1/240$ grain strychnine in the other hip. He listened to heart and counted an impulse of 15 to the minute. In two hours he gave a small dose of digitalin in shoulder. Counted pulse about this time and heart-beat was 130 per minute. The babe cried lustily in the meantime, and he handed it to its mother to nurse.

Couche thinks that some one in like circumstances may find this interesting. The idea is not original, as Couche read of a

case of a woman dead before child was delivered, in which pituitrin, injected in the stump of the navel, started the heart beating.

INFANTILE DIARRHEA PROPHYLAXIS.

In the *New York Medical Journal* of July 14, 1917, ZIERLER reminds us that breast-fed infants will come through hot summer months if such simple measures as cleanliness, fresh air, regularity in feeding, and quiet are observed. The importance of maternal nursing is obvious and should be encouraged. In over ninety per cent of cases of summer diarrhea the artificially fed infant is the one attacked. The importance, therefore, of proper mixtures of percentage feeding and the supply of pure, uncontaminated milk becomes obvious. The infant who is fed on a proper formula, gaining steadily, and who is free from gastric disturbances prior to the advent of hot weather, will in the majority of cases come through the hot summer months with very little disturbance. On the other hand, an infant carelessly fed on patent foods or unsuitable modifications of cow's milk will in the majority of cases fare badly. The high mortality among infants from diarrhea is undoubtedly among this class of carelessly and unscientifically fed cases.

Milk intended for infant use should be thoroughly supervised by the health authorities and should conform to a certain standard. During the hot months the milk should be pasteurized or sterilized, bearing in mind, however, that neither process will render inert the product of bacterial growth in a dirty, contaminated milk. The proper handling of the milk after it reaches the house should be impressed upon the mother. It is remarkable how often some of the worst cases of diarrhea will show rapid improvement when put on a suitable formula of clean, pasteurized milk. Intelligent feeding and the proper milk supply, therefore, cannot be too strongly emphasized as the most important prophylactic measures at our command. A bottle-fed infant should be placed on a proper formula of

percentage feeding from the very outset, and remain under the supervision of the physician throughout the nursing period, the formula to be changed from time to time to meet the individual requirements. The directions to the mother for the preparation of the mixture should be simple and explicit, and the physician should satisfy himself that his instructions are carried out thoroughly.

THE NATURE AND PREVENTION OF SHOCK.

The *British Medical Journal* of March 24, 1917, in discussing this subject editorially says that, as to treatment, the importance of prevention must be insisted upon, and it is pointed out that an antecedent hemorrhage, insufficient in itself to produce collapse, may be an important factor in the subsequent onset of shock, in so far as it is due to deficient volume apart from increased viscosity of the blood. The normal reaction to simple hemorrhage sufficiently large to diminish the output of the heart and lower the blood-pressure consists in the abstraction of fluid from the tissues until the volume of the blood is again adequate. The experiments which have been reported suggest that this restorative reaction fails in shock, and that the fluid continues to pass from the blood, even though the arterial pressure has fallen to a very low level. A relatively small hemorrhage, therefore, may have a serious influence in determining the onset of shock. Other causes tending to diminish the blood volume—such as fatigue, exposure, or prolonged abstinence from food and water—are well recognized by military surgeons as tending to shock; but it may be that sometimes measures preparatory to operation in hospital, such as free saline purgation and strict abstinence from food and water, may contribute to the danger. At any rate, they believe it to be true that the experience of the casualty clearing stations in this war is that exactly the opposite line of treatment must be followed in attempting to restore a patient sufficiently to withstand an operation; and so far, therefore, clinical prac-

tice has anticipated the experimental conclusion that a free supply of fluid by infusion of physiological saline into the rectum or the subcutaneous tissues should be begun before operation.

The only drug which can be used to any advantage when shock has once developed is pituitary extract, which causes prolonged and general contraction of the arterioles, thereby diminishing the capacity of the circulatory system and mitigating the effect of a deficient volume. The use of adrenalin, apart from the fact that its effect is fugitive, is of no objection. In place of the injection of physiological saline in fully developed shock the use of intravenous injections of tonic saline is suggested in the *Journal*, found valuable in the treatment of cholera and dysentery; the addition of calcium chloride to the solution is proposed inasmuch as it has been found that calcium ions have a specific action in reducing the normal permeability of capillaries. The aim in the treatment of shock should be to restore the volume of blood in the circulation and at the same time to counteract the abnormal viscosity. An important effect of failure of the circulation is defective oxidation of even the blood, a fact which suggests that the conditions of oxygen may have some value.

CLINICAL OBSERVATIONS ON DYSENTERY.

The *British Medical Journal* of March 31, 1917, contains an article by Evans which he records his experience in the Indian medical service. He well points out that the symptoms of dysentery vary according to the type of infection and according to the acuteness of the disease. Tenesmus forms the most important symptoms, the frequency and character of the stools, and the degree of tenesmus. From the severity and progress of each case must be judged. The temperature runs no definite course, but as an aid to treatment it must not be overlooked. In severe acute cases it may run up to 104° or 105° F., with

ers it may be subnormal. In the latter e of case there may be varying degrees collapse, which should be treated accordingly.

The disease in some cases begins as sim-diarrhea; in others the onset is sudden, h frequent stools containing varying ntities of mucus and blood, with colicky ns in the abdomen. Tenderness over the cending and sigmoid colon is also a fre-nt sign.

n severe cases the fecal elements in the ols soon disappear, and the patient passes ge quantities of mucus tinged with vary-proportions of blood. In some cases er a few days there may be no trace of od to the naked eye, while the patient y pass frequent motions containing large ntities of purulent mucus.

Tenesmus as a rule is not very marked in bacillary type, and may be absent alto-her. This is the symptom which is al-ist characteristic of amebic dysentery. In ere cases it may be so intense that the ient dare not leave the commode, while pain and straining may bring on a cer-n degree of collapse. All the patient ses in such a condition consists of very all quantities of blood-stained mucus.

It is extremely important amongst troops t every case of diarrhea, however mild, ould be promptly treated and checked. ch one should, if possible, be admitted to hospital and the stools rendered innoc-u. Simple diarrhea frequently goes on to dysentery unless treated in time, especially localities where the disease is endemic.

All cases of dysentery should have abso-e rest in the recumbent position. Evans e found that when cases are allowed to lk about recovery is greatly delayed.

The diet should be very sparing and ould consist at first of nothing but barley ter or rice water; later milk may be en, but should the milk be passed un-ested, whey should be given instead or a w grains of sodium citrate added to each t, and the result watched in each stool. e less soups and broths given the better. miss or sour milk is an excellent diet and a easily be made anywhere in the East. A

few spoonfuls of dhali or leban are obtained from the nearest village and put into fresh or sterilized tinned milk. It is then kept at an equable temperature for a few hours, when it is ready for use. The time varies with the degree of activity of the culture of the lactic bacillus obtained and the tempera-ture at which it is maintained.

As the patient progresses, rice thoroughly boiled in water is the best solid to begin feeding with. It is easily digested and does not contain too much starchy matter like sago, arrowroot, etc. Great care should be taken with the dieting, and the importance of personally examining every stool passed by the patient cannot be sufficiently em-phasized. From this inspection only can the diet be regulated.

Soldiers frequently, when they are pro-gressing favorably, complain about the meager diet they are getting, and to supple-ment this sympathizing friends from the lines may attempt to supply them secretly with all kinds of indigestible foods; a relapse is the usual consequence. The medical officer by examining each stool holds the master key, and can act accord-ingly. Malingerers can be caught out in this manner. Instances have occurred where the patient had deliberately kept up the symptoms by eating unauthorized foods so as to be sent back toward the base.

To prevent the spread of the disease from infected stools, each stool should be pro-ected from flies and destroyed whenever possible by incineration; should this be im-possible, then it should be rendered innoc-uous with one of the various disinfectants.

All cases of acute dysentery coming into hospital were given 2 drachms of magnes-ium sulphate every two hours until the stools became feculent or until 2 ounces had been given. This was done as a routine measure unless the dysentery was of the amebic type.

This method of treatment with rest and dieting has proved in Evans's experience to be most satisfactory. If there was no im-provement from this, the patient was then given bismuth salicylate and salol ää 10 grains three times daily for three or four

days, and at the end of this again went through a course of the magnesium sulphate treatment. This salt acts mechanically by ridding the patient of the bacterial and other débris in his intestinal canal, and possibly also by virtue of its lymphagocic action may draw into the intestinal canal any antitoxins that may have been found in the patient's blood.

With this treatment in the field ambulance it was found possible to return to duty within fourteen days 90 per cent of the cases of dysentery which occurred amongst the Indian troops at Anzac.

Should the patient have intense pain, hot fomentations applied to the lower part of the abdomen will frequently relieve it; otherwise, 10 minims of camphorodyne or 10 grains of Dover's powder will be found to act satisfactorily.

The promiscuous injecting of emetine in every case of dysentery is distinctly harmful. The results are very disappointing, and one's faith in its specific action in amebic dysentery is apt to be shaken. It should only be used in those cases that are distinctly amebic in type, or in which the entameba has been discovered in the stools. Emetine was found to have little effect in cases of mixed dysentery until the patient had gone through a course of the saline treatment first, when it had the same marvelous action as one observes in India in cases of simple amebic dysentery.

The injection of emetine should not be done indiscriminately, and the result of each injection should be carefully observed. In suitable cases a grain should be injected subcutaneously night and morning. If no good results occur after four injections, it should be stopped, on account of the depressing influence it exerts. It can be resumed after a few days' interval if thought necessary.

Chronic dysentery is a far more difficult and intractable condition to treat. The results of medical treatment in bad cases that have persisted for several months have proved to be very unsatisfactory. The majority of chronic cases are by no means simple infections, other intestinal micro-

organisms step in as soon as the bow comes seriously damaged, and a state of chronic toxemia arises.

Evans is indebted to Major E. F. I.M.S., for permission to observe a number of cases among the Turkish prisoners of war that were in his charge. In post-mortem examination of the large intestine in a few cases that died, his conclusion that medical treatment has very little influence on the progress of the disease was verified. In practically all cases examined the whole of the large intestine was affected, the cavity with extensive ulceration and in some parts total destruction of the mucous membrane. Where an attempt had been made at repair the intestinal wall had become converted into dense fibrous tissue, and would in time have formed strictures. The ulcers have been liable to break down on the slightest injury. The pus, which lined the whole mucous lining, was very foul, and it was evident that the bacillus coli took an active part in helping to bring about the present condition. The immediate results of laparotomy and washing out the large intestine with ordinary eusol solution were excellent. Though all cases operated on by Major Sealy and Evans were in a very debilitated condition, and the patients were actually scorbutic, the shock from the operation itself was *nil*. The lavage was done night and morning through a fine rubber catheter, and fully two quarts of the eusol solution allowed to pass. The patients experienced no pain or inconvenience, and a large fluid was passed by the rectum within a few minutes or so. The fluid passed contained away all the foul débris in the large intestine, and absorption was prevented. The stools that were passed were rendered less foul, the septic appearance of the patient improved wonderfully, and the temperature came to normal. Difficulties later owing to the appendix contracting to the skin wound closing up. This operation gives good results for a time, but they are not maintained. Relapse is almost certain to occur, the reason, in Evans's opinion, being that it does not provide the necessary rest for the large intestine.

The ideal treatment in such cases would be an ileocolostomy with appendicostomy and lavage. It is only in this way that the bowel can have the required rest. The injection of emetine in cases in which the *entamoeba histolytica* is proved to be present should be carried out; of its specific action on the *entamoeba* there is no doubt; still its action on the ulcerative and septic changes in which at this stage other organisms are taking part is *nil*.

A STUDY OF ETHYLHYDROCUPREIN (OPTOCHIN) IN THE TREATMENT OF ACUTE LOBAR PNEUMONIA.

In the *Archives of Internal Medicine* of April 16, 1917, MOORE and CHESNEY make a report upon the clinical use of ethylhydrocuprein. They think that on the basis of the evidence presented in this communication the following suggestions may be made for the use of the drug, although the observations are too few in number to permit of dogmatic statements:

1. It would seem, as far as present knowledge goes, that optochin hydrochloride is best administered by the mouth in acute lobar pneumonia. (The drug is preferably given in capsules, because of its bitter taste.)

2. The drug should be administered in such amounts as will insure the rapid production and more or less constant maintenance, within the blood stream, of a concentration sufficient to exert bactericidal action on the pneumococci.

3. To achieve this result, the total amount of optochin given by the mouth per twenty-four hours should bear a definite relationship to the body weight of the patient, namely, at least 0.024 gm. of optochin hydrochloride per kilogramme of body weight. (It is possible that, after one or more days' administration of the drug, less amounts may suffice owing to retention or accumulation within the body.)

4. To secure the rapid production of bactericidal action in the blood stream the initial dose should be larger than the subsequent ones, the body weight relationship being at all times preserved.

5. The individual dose should be given regularly throughout the treatment and the intervals between the doses should, in general, not exceed two or three hours. Thus, in the case of individuals of average weight, say of 62 kg., 0.024 gm. per kilogramme of body weight per twenty-four hours would mean a total of 1.5 gm. of the drug per twenty-four hours.

First 24 hours of treatment	Initial dose of 0.45 gm. Interval of three hours Seven doses of 0.15 gm. each, with an interval of three hours between each two doses	Total 1.5 gm.
Subsequent periods of 24 hours each	Ten doses of 0.15 gm. each, with an interval of about 2½ hours between each two doses	Total 1.5 gm.

When the patient is below average size, the utilization of the same body weight relationship should insure the production of the bactericidal action in the blood stream; such patients require a smaller total quantity of optochin per twenty-four hours than patients of greater weight. For example, a patient weighing 42 kg. should require only 1.0 gm. of optochin per twenty-four hours. The size and spacing of the individual doses in such a case are indicated in a succeeding paragraph.

When the patient is above average weight, in order to preserve the desired relationship between the amount of the drug and the body weight, more than 1.5 gm. must be given per twenty-four hours. Thus, a patient of 80 kg. would receive a total quantity of 1.9 gm. per twenty-four hours. Whether this comparatively large dose is safe or not, they cannot say. The possibility of untoward effects should always be remembered not only when such larger total daily doses are used in larger patients, but also in the case of small or average-sized persons, even though the body weight relationship be maintained. In the use of the drug impairment of vision should be carefully looked for, and the drug should be discontinued, or at least reduced in amount, on its appearance. Daily ophthalmoscopic examinations might be advantageous.

Experiments *in vitro* have shown that the pneumococcal action of optochin is manifest in very high dilution, and that the con-

centration required for the production of bactericidal action is not much greater than that which produces inhibition of growth. If an average-sized individual, say of 60 kg., receives 1.5 gm. of optochin, and a large individual, say of 80 kg., receives the same dose per twenty-four hours, the former would get 0.007 gm. of the drug per kilogramme of body weight per twenty-four hours more than the latter, an amount which the authors, from their experience of the drug *in vitro*, would expect to be sufficient to replace mere inhibition by actual bactericidal action in the serum.

The present study comprises too few cases to permit of final decision regarding the optimum dosage of the drug or its value in the treatment of lobar pneumonia; these points can only be ascertained when a much larger series of cases is available for analysis. The following conclusions they think are justifiable:

1. Variations in the concentration of ethylhydrocuprein (optochin) hydrochloride in normal horse serum are evidenced by corresponding variations in the degree of inhibitory and bactericidal power on pneumococci, when the drug is allowed to act on these microorganisms in the test tube at 37° C.; the degree of the specific inhibitory or bactericidal power of optochin-containing serum gives an indication of the concentration of optochin present.

2. The members of a four-hour bouillon culture of pneumococcus are more resistant to the action of optochin than those of a twenty-hour culture.

3. The use of "young" (four to six hours at 37° C.), actively growing bouillon cultures of pneumococci in bactericidal tests affords a more delicate index of the differences in the degree of inhibitory or bactericidal action of different concentrations of optochin than does the use of older (twenty hours at 37° C.) cultures.

4. As judged from the present series of thirty-two cases, when optochin hydrochloride is given by mouth to patients suffering from acute lobar pneumonia in such amounts that they receive at least 0.024 gm. per kilogramme of body weight per twenty-

four hours, and when the size and spacing of the individual doses are adequately regulated, a specific pneumocidal action appears in their blood within a few hours, and it can be maintained more or less constant for several days.

5. In order to maintain the bactericidal action in the blood at a constant level, intervals between the individual doses given by mouth should not ordinarily exceed one and one-half to three hours.

6. When optochin is given by mouth according to such a scheme of dosages as is outlined, the evidence points to some degree of retention or accumulation in the blood of proportionately more of the drug absorbed.

7. Administration of optochin hydrochloride by mouth appears to be more satisfactory than intramuscular administration. Further study of intramuscular administration appears to be desirable.

8. Pneumococci, not only *in vitro* but also in the human body in patients treated with optochin, may acquire the property of "complete resistance or immunity" to the drug.

9. Toxic symptoms, such as tinnitus, deafness, amblyopia or amaurosis (retinitis), may be observed in the use of the drug in man; they are generally transient, but, if severe, may result in more or less permanent impairment of vision.

[The statements in 8 and 9 are of great importance, particularly the last in paragraph 9. This would seem to throw grave doubt as to the wisdom of using the drug.—Ed.]

RESULTS OF SCOPOLAMINE-PHINE TREATMENT DURING LAST FIVE YEARS IN 150 CONSECUTIVE CASES

In the *British Medical Journal* of 17, 1917, GREENWOOD first speaks of the effects on the child and says that as a rule, no symptom has given rise to so much misgiving as oligopnea he proposes to set out his experience of it. If the treatment is administered as it should be (with admitted attendant watchfulness and demands) there is no need whatever to deep a grade as to produce "blue babies"

slight degree of oligopnea is certainly not uncommon, though its incidence diminishes with the increased experience of the operator. Marked and persistent cyanosis points to an error of technique or of judgment.

The slight oligopnea to which he has referred is characterized by the following features: An initial cry at the moment of expulsion, immediately followed by a marked quietude which may persist even for an hour; if the respiration is altered at all it is a little slower and perhaps a little shallower; heart-beats continue vigorous and normal in every respect; the child simply seems lazy or tired.

Of the 150 cases under consideration, 23 (15.33 per cent) showed this slight oligopnea. But of these 23 cases, three had a second small dose (grain $1/12$) of morphine—a practice Greenwood has long since abandoned. Omitting these three cases we get 13.33 per cent of slight oligopnea. Early in 1916 he used eutocine (the detoxicated morphine of Lauret) in four cases with very small doses of scopolamine; in each of these cases the infant was slightly oligopneic, and this certainly suggests more than a coincidence, especially as the only three cases in which a second dose of morphine was given showed the same tendency. Of the above 23 cases, therefore, 16 were treated exactly as is his present procedure. This gives a slight oligopnea in 10.66 per cent.

The average time the above 23 cases were under treatment was 6 hours 39 minutes; omitting the three cases in which morphine was given twice and the four cases in which eutocine was used, the remaining 16 were under treatment 4 hours 45 minutes. This, Greenwood is convinced, contains the whole philosophy of oligopnea; if it is to be avoided altogether, morphine should certainly not be given late in labor; or, if given, the morphine should be proportionately diminished in dose. The average length of time during which the cases in his series presenting no oligopnea were under treatment was 7 hours 35 minutes. The cases in which the infants were at all oligopneic, it

will be seen, were the cases of short duration. This clearly indicates that oligopnea is due mainly, if not entirely, to the morphine. Greenwood is not suggesting that this slight degree of oligopnea is critical, for he has intentionally refrained from interference, though prepared to resort to artificial respiration if necessary, but the condition of the infants was never alarming. Only in two cases has he resorted to artificial respiration—one a difficult forceps extraction, and the other a case in which the cord was three times round the neck of the infant. Both cases recovered.

Considering the effects on the mother he states he has made it a constant practice to begin this treatment early, often as soon as labor had definitely begun. In a few of the cases there appeared to be slight retardation of the uterine contractions after the initial dose, but after it only. His experience has been that after the second and subsequent doses the contractions have become normal, and in not a few cases really severe. He feels justified in saying this has probably quickly regained the little time that may have been lost, and therefore labor on the whole has not been retarded. Possibly, in the few cases in which an initial delay appeared to occur, there was present some slight idiosyncrasy to morphine.

Perhaps the most striking after-effect on the mother is the remarkable absence of exhaustion and shock. After a labor lasting twenty-four to forty-eight hours or more the patient will often sleep a few hours, and on awakening be astonished that labor is over, and have such a feeling of well-being that she cannot realize anything has occurred.

So long as complete amnesia, and not analgesia, is aimed at and maintained, Greenwood has no hesitation in saying his experience proves that there is no risk either to mother or infant. If pushed to the slightly further stage of analgesia the risk may be grave; but as the margin between amnesia and analgesia is small, the necessity for constant watchfulness by the obstetrician is all the more emphasized.

The influence on the pulse is interesting. In $11 \frac{2}{3}$ per cent of the above 150 cases the pulse-rate was increased; in 36 per cent it remained the same; in the remaining $52 \frac{1}{3}$ per cent it was diminished. In all the cases except two the character of the pulse was at least as good as at the onset of labor; usually it was improved. The two exceptions were cases complicated by influenza and an acute attack of cholelithiasis respectively.

While Greenwood's observation may not be of any particular technical interest, it is certainly of some moment from a national point of view at the present time. In this series of 150 cases he has certain knowledge that in nine the patients had resolutely refused to entertain the idea of a child. Hearing of the scopolamine-morphine treatment they decided the time was ripe to embark upon the responsibilities of parentage. The result is an increase of 6 per cent in the birth-rate in this series. This figure three times covers the infant mortality at birth in the 150 cases, and is rather significant.

MEDICAL GYNECOLOGY.

Loop in the *New York State Journal of Medicine* for April, 1917, well says that gynecological patients usually consult their family physician, and it is he who has the first opportunity to make the diagnosis which shall put them on local, palliative, or radical operative treatment. For his guidance Loop would suggest a simple classification of his findings into congenital defects or deformities, neoplasms, infections, traumatism incurred during labor, and the sequelæ of labor or abortion. From this list Loop would at once strike off as unsuitable for local treatment in its commonly accepted meaning all new growths, tumors of any kind or location. Even though nothing more than a urethral caruncle or small uterine polyp extruding from the external os be found, with which he may be entirely competent to cope, yet the treatment of these conditions must be considered surgical and not within the scope of this paper.

Regarding congenital deformities fetal remains, no such sweeping statement can be made. The sterility and dysmenorrhea due to infantile uterus may often be relieved by medical and local treatment while atresia at any point of the genital canal, septa of the vagina or uterus, or absence of any of the component organs are absolutely unsuited to these methods. Young or unmarried women suffering from these conditions are often subjected to gross malpractice because of the average physicians feel to examining such conditions. The most classical case of atresia of the vagina which Loop has encountered dragged out a miserable existence from puberty to marriage, with constantly increasing pelvic pain and a slowly developing enlargement in the pelvis, until the perineum was stretched as with the head and the rectum was almost entirely obstructed before an examination disclosed the real nature of her distress. We must not allow our modesty to interfere with our duty. As for the patients, such a suffering has no modesty left; her sole thought is to be relieved.

Infections from the standpoint of treatment must be subdivided into acute and chronic types, the nature of the infecting organism, whether the gonococcus, streptococcus, the colon group, or what not, also the point of attack must be considered. Vaginal, urethral, or bladder infections and puerperal infections of the uterus almost a crime in our day, should be met with prompt and vigorous resistance. Acute infections of the tubes, pelvic peritonitis and cellular tissues are best treated by palliative measures, watchful waiting, and unmindful of vaginal douching and vaginal puncture. Many of these cases recover by resolution, while many more, after a storm, must be treated by radical or conservative surgery. It is in this latter class of cases that much of the abuse of treatment is seen. The family physician must know the limitations of palliative treatment and must not subject his patients to months or years of tampons, douches, and chronic invalidism.

Injuries from childbirth, neglected or unsuccessfully repaired at the time, which destroy supporting structures or leave eroded surfaces for the absorption of infection, are not properly cases for palliative treatment and should only be so managed when there exist definite contraindications for radical treatment. Other sequelæ of labor, of which subinvolution is the most frequent and has the greatest morbidity, if uncomplicated by injury, may usually be best treated by palliative means.

The management of these cases, then, hinges on accurate diagnosis, good judgment, and a knowledge of the possibilities and limitations of therapeutic measures. Loop makes no pretense to a comprehensive consideration of the subject, but wishes rather to bring attention to a few of the commonly encountered conditions which he believes to be properly and often best treated by local means, together with some methods of treatment which he has found extremely useful, but which have been more or less frowned upon by the authorities, and somewhat feared, doubted, or ignored by the profession.

Congenital deformities and diseases are often difficult of detection because so often encountered in virgins. Loop would emphasize the value of the bimanual examination per rectum in these cases especially, although it is often of great service in parous women. Local treatment of non-parous women is limited to those in whom the hymen and vagina will permit instrumentation. In the congenital classification he includes those abnormalities which have existed from birth, or which are first evidenced at puberty or after marriage and which are not neoplastic, traumatic, or infectious in origin.

Infantile uterus, when possible, is best treated by non-operative means. In addition to the usual hygienic and tonic measures, the use of graduated uterine dilators, the intrauterine application of 95-per-cent phenol or iodine, and if possible, after some progress, the use of a stem pessary, which may be left *in situ* with impunity for many months, together with the careful

administration of small doses of thyroid extract, $\frac{1}{4}$ or $\frac{1}{2}$ grain twice daily, has been more fruitful of results in Loop's experience than the usual curettage. It is well known that thyroid extract has a selective action on the generative organs, stimulating them to normal activity.

Amenorrhea when not due to the great physiological cause, pregnancy, or to some physical obstruction, may well be treated by much the same methods, and with excellent results. Of late, Loop has used corpus luteum instead of thyroid extract in these cases, and with much satisfaction. In the strenuous type, however, thyroid extract always has a marked effect for good. Curettage does these patients little or no good and its results are almost always temporary. Depending on some obscure fault, local stimulation, together with our feeble, groping opotherapy, seems and is far more rational than curettage. Yet many of these cases are referred for curettage. Actual physical obstruction is about the only indication for operation in these particular cases.

Dysmenorrhea is one of the most frequent complaints the physician hears, and it merits all the attention that its victim insists on, for aside from the danger of drug habits, whether as a cause or effect, it is so often associated with cystic disease of the ovaries as to be considered more than a mere coincidence. Loop is firmly of the opinion that many ovarian cysts are due to back pressure from a spasmodic dysmenorrhea. Now we are offered as our defensive weapon, dilatation and curettage, and who of us has not been disappointed in its results in, Loop might safely say, the majority of cases? Having ruled out, by careful examination, cystic disease of the ovaries, tubal disease, varicosities of the broad ligaments, etc.—*i.e.*, having arrived at a positive indication for curettage—Loop contends that the use of graduated dilators where necessary, the intrauterine application of phenol and iodine, followed by the introduction of a stem pessary, and in some cases the use of very small doses of thyroid extract, will accomplish results of a far

more lasting and satisfactory character than the orthodox treatment with the curette.

The stem pessary is looked upon with fear by many physicians. Loop has used them for many years, introducing them at the office under fairly aseptic technique, and has left them in place for as long as twenty months, with none but good results. There are a few patients with a positive indication for them in whom the vagina is so small or the cervix so tight as to preclude their use except with an anesthetic. A curious fact has been that when introduced after dilatation under anesthesia, they have invariably been expelled within a few days, even though he has tried to insure their retention by a suture of kangaroo tendon through the cervix. This shows that our rapid dilatation lasts for a short time, that the cervix does not shut down enough to hold the pessary, but a return of the old symptoms proves that it is not for long. In these cases Loop has usually been able to replace the pessary before contracture took place. Here again he wishes to emphasize the action of thyroid extract on the pelvic organs. Do not forget it in the treatment of amenorrhea, dysmenorrhea, and sterility.

Endometritis, leucorrhea, menorrhagia, dysmenorrhea—these are almost synonymous terms. In cases in which the treatment can be carried out, Loop has rarely administered an anesthetic for curettage alone, and he submits that he has had more complete and lasting results than from operative treatment. Reed was the first to recommend the use of phenol as a local application to the endometrium so far as Loop knows, and since reading his work some ten years ago Loop has used this treatment in endometritis almost to the exclusion of curettage or in connection with it where an anesthetic had to be administered for some other purpose. Graduated sounds are used where necessary, and the uterine cavity swabbed out with 95-percent phenol, or better, where possible, $\frac{1}{2}$ -inch selvage tape saturated with it is packed into the cavity and is left for twenty-four hours unless expelled by uter-

ine contractions. A dossal of cotton saturated with alcohol is placed behind the cervix to neutralize the overflow. Appropriate tampons may be used in the vagina at the same sitting and the whole arranged so as to be easily pulled out in twenty-four hours. A hot saline douche should be used immediately after the withdrawal of the tampon and packing, and in most cases can be used to advantage every night until the treatment is repeated, which is ordinarily on the fourth or fifth day. A wide experience with these measures enables Loop to say that they may be carried out at one's office without infection, that there is no danger of toxic symptoms from the phenol, and that the results are excellent, better as a rule than simple curettage in like conditions.

FURTHER OBSERVATIONS ON THE TREATMENT OF CANCER OF THE CERVIX BY THE PERCY CAUTERY.

TALIAFERRO in the *Charlotte Medical Journal* for April, 1917, states that in his opinion Percy, who in 1912 described his method of treating cancer of the cervix with the cautery, has done more for the relief of this condition than any man so far known.

He has demonstrated that the cancer cells are killed at a temperature of 113° to 131° —while the healthy tissue is not affected. At this temperature the heat will penetrate quite a distance.

Percy has worked out a beautiful technical plan. His method of protecting the vaginal wall with the water-cooled speculum, controlling the degree of heat by the hand in the abdomen as well as the electric cautery, makes this technique extremely simple.

Taliaferro has followed this technique as closely as possible and the results have been gratifying.

Taliaferro believes that every case of cancer of the cervix should be first treated with the Percy cautery. It is surprising to see a large carcinoma with pelvic infiltration disappear after the use of the cautery. Frequently, cases which seem inoperable soon become operable under this treatment.

is interesting to note that in sixteen cases of carcinoma of the cervix that were treated by the Percy cautery at the Mayo Clinic, later on, when a hysterectomy was performed, only three of them showed cancerous tissue. This goes to show what a powerful effect a low degree of heat has on cancerous tissues.

Taliaferro has treated quite a number of cases with a large cauliflower mass, terrible pains, and an extremely foul cancerous discharge, with the uterus fixed firmly in the pelvis. These cases looked almost hopeless, but by the Percy technique it was most gratifying to see a wonderful change brought about in a few weeks. During this time the pain and discharge were stopped and the uterus became movable. The patient, likewise, picked up a great many pounds in weight. Even if the Percy cautery was used in another class of cases, it would be a godsend to these terribly afflicted. In cases not so far advanced, Taliaferro believes it is wise to first use the cautery, and later on, about four weeks, to do a hysterectomy. This may not be necessary in all cases, but he believes that when an organ is once cancerous it should, if possible, be removed; the same influences which first brought about the cancerous condition may again become active.

Some advocate the use of large doses of radium delivered through the Coolidge tube. With this, Taliaferro is sorry to say, he has had no experience, but from reports it works well in many instances.

The technique which he follows is that of Dr. Percy, who in a paper read before the Clinical Congress of Surgeons in Boston, in October, 1915, and published in *Surgery, Gynecology and Obstetrics* in January of this year, has this to say:

"Open the abdomen. Only by doing this can uterine cancer be safely and most effectively treated by the application of heat. Use a low degree of heat. If a cauterizing temperature is used in the heating process, a carbon core is formed in the cancerous mass. This inhibits the dissemination of heat.

"Pass the heating head through the utero-

cervical junction to the fundus of the uterus. Keep it in one position until the whole mass contiguous to the heating iron is made so hot that it cannot be held longer in the surgeon's hand when encased in a medium rubber glove.

"Apply the heat until all the structures that were fixed at the beginning of the application are freely movable. To do less than this must of necessity defeat the object of the treatment—i.e., the complete penetration of all the cancer-infected area possible. Can this be done in every case? No! Can it be done in the majority of cases? Yes."

In cases far advanced Taliaferro believes it wise to first use the cautery without opening the abdomen, and at a later sitting open the abdomen and do a complete Percy application. For these cases are greatly debilitated and weakened from loss of blood, and to do a prolonged operation at this time in his judgment is not wise. He has treated two cases with a large cauliflower mass by this method, with very satisfactory results.

He believes that this should be especially done in old women who are bad surgical risks.

As previously stated, Taliaferro thinks that in the judicious use of the Percy cautery we can cure carcinoma of the cervix when not far advanced; and that it is a truly wonderful agent in the relieving of distress in those unfortunate cases who, through their own neglect or somebody else's bad judgment, have gone beyond surgical aid.

* * *

In order that this matter may be presented from both points of view we append the summary and conclusions from an article published in *Surgery, Gynecology and Obstetrics* for February, 1917, by LEONARD and DAYTON. They state that the primary effect of the Percy cautery is to cause a necrotic mass extending more or less uniformly in all directions from the coagulating point.

A mass of sloughing coagulated tissue of this type offers an ideal medium for the

growth of microorganisms. This is borne out by the sections of the two fatal cases they report. It probably will be found impossible to prevent infection around this area, and once infected the thrombosed vessels of the region may offer a ready entrance into the system. Therefore the danger of a septicemia is considerable.

They are convinced, from their short experience with Percy's method, that fatalities must have been frequent wherever this method has been used extensively, yet they have been able to find only one complete report of a fatal case in the literature, that of Boldt. This case is of particular interest to them because it agrees in all essential points with the findings in this second case, and emphasizes the probable frequency of the development of a septicemia from the infected tissue at the coagulated area. In an article in the *Pennsylvania Medical Journal* (January, 1916) Percy mentions four cases in which "post-mortem examination disclosed more or less of these lytic cells in a pulaceous mass, free in the pelvis. In one case there was easily a pint of this material." The description of the clinical picture of these cases agrees fairly well with that of fatal septicemia, and it seems possible to suppose, since blood-culture, microscopical examination, or cultures of the mass were not reported, that the four cases may have died of sepsis.

In Boldt's case, and in the two cases reported above, the Percy technique was applied most rigidly. Nevertheless, microscopic sections show active uninjured carcinoma respectively four, eight, and sixteen days afterward. In both of their cases it was found within one centimeter of the previous site of the heating iron.

1. The prolonged treatment of large carcinomatous masses by low heat may result in a rapidly fatal outcome with lesions similar to those in cases of fatal cutaneous burns.

2. The necrotic mass produced by the cautery forms a particularly favorable medium for bacterial growth. The organisms may spread to the surrounding tissues or reach the general circulation through the

local thrombosed vessels. It seems probable that the greatest danger in the application of the Percy cautery is a local infection and a subsequent general sepsis.

3. Finally, the technique is ineffectual in eradicating the carcinoma. There is no evidence from these two cases that carcinoma is more susceptible to heat than is normal tissue.

NITROUS-OXIDE-OXYGEN, THE MOST DANGEROUS ANESTHETIC.

In the *Interstate Medical Journal* for March, 1917, BALDWIN asserts that there is evidence of a tendency on the part of the official medical press to suppress criticism of this anesthetic. He also claims that if the time ever comes when nitrous-oxide-oxygen anesthetists will honestly report their fatalities, when they will eliminate the advertising element, when they will reduce their fancy charges for its administration to the level of the administration of ether, we will at once find that the use of the new anesthetic will be limited to its especial field of usefulness as suggested by Ochsner—namely, to cases of acute pulmonary congestion, and of acute nephritis. To quote from the conclusion of Baldwin's former article: "With these exceptions, which make its field a very limited one, nitrous-oxide-oxygen should be looked on as the most dangerous anesthetic that can be used, even in the hands of the most experienced."

Baldwin has noted with interest and satisfaction that Bloodgood, in the December issue of *Progressive Medicine*, announces that at the Johns Hopkins, where nitrous-oxide-oxygen was used so enthusiastically a very few years ago, they have within the past eighteen months gradually returned to ether. He particularly condemns the nitrous-oxide-oxygen in cases in which the blood-pressure is high. In addition to this discontinuance of the nitrous-oxide-oxygen in his own clinic, he adds: "The clinics which first began the routine employment of gas-oxygen anesthesia instead of ether are beginning to swing back to ether."

THE USE OF EMETINE.

The *Indian Medical Gazette* for February, 1917, states that HOOTEN made a report on this subject to the Poona Medical Society to the following effect:

Years ago he gave a dose of $1/6$ grain daily to two children of five and seven years respectively, with almost immediate success and no bad results, and he said he would have no hesitation in giving doses of $1/12$ to $1/6$ grain to infants, if milder measures failed.

It was clear that further evidence was required with regard to the use of emetine in adults, and still more in children. In the meantime, speaking for himself he had come to certain broad conclusions:

(a) In adults he considered emetine should be given at once in all severe cases of dysentery, and that in the absence of great debility, in which case a commencement should be made with smaller doses, or special idiosyncrasy, which must be looked out for, a dosage of one grain daily was safe and might be continued uninterruptedly, if desired, for about ten days. At the same time a dose of castor oil and opium (1 ounce, with 30 minims of the tincture), or a short course of saline aperients, should be given at the start. In his experience treatment for six days had usually proved sufficient.

(b) Most cases of what one might call dysentery, clinically, in children, in his experience, yielded to castor oil emulsion and diet. Where they persisted, in spite of such treatment, he should use emetine, in doses of $1/12$, rising to as much as $1/6$, in infants. In older children he should not hesitate to increase the dose, reasonably, in proportion to age.

In the above remarks hypodermic injections were understood in all cases. In conclusion he observed that many cases of dysentery were of course not due to amebæ. In these, emetine might be expected to fail, and if after five or six days no improvement occurred in an early case, it might be assumed that amebæ were not present and the drug should be stopped. In chronic cases the treatment might be persisted with

longer, at intervals. Large doses of bismuth, starch, and opium enemata, lavage of the large intestine with various solutions, and other measures, might be also called for. Microscopic examination of the stools was desirable, but under ordinary conditions was often not available.

An interesting discussion followed, and Hooten in summing up said that he was glad to find that the majority of the members who took part in the discussion were practically agreed with him in what he stated, that the evil effects of emetine were not great if it was carefully employed. He thought that two cases mentioned could not fairly be taken as deaths from emetine, and that probably there might have been other circumstances which would account for fatal results. As regards doses he was of opinion that a course of one grain given hypodermically for five or six days was without any bad effects, and he thought dividing it into two $1/2$ -grain doses was inconvenient, especially in the case of private practice.

SCARLET R IN CERTAIN DISEASES OF THE CONJUNCTIVA AND CORNEA.

Writing in the *Indian Medical Gazette* for February, 1917, KIRKPATRICK states that he has found the use of scarlet R to be so beneficial in atrophic conditions of the conjunctival and the corneal epithelium that he thinks it worth while to draw attention to its value.

Scarlet R has been recommended for use in corneal ulceration, but he has found it much more effective in xerotic conditions. Its use was first suggested to him by seeing it recommended by a writer in the *Journal of Laryngology* as a stimulant to the epithelium in atrophic rhinitis.

He first used it two years ago in the case of a woman who was suffering from a very severe xerosis of the conjunctiva and cornea which had followed on trachoma. The condition was a long-standing one, both corneæ were quite dry and insensitive, and the conjunctiva completely xerotic, with shrunken fornices. Vision was reduced to the perception of large objects near the face.

Scarlet R in castor oil was dropped into her eyes daily, and in a short time Kirkpatrick was surprised at the improvement that took place. The conjunctiva softened and became more elastic, whilst the cornea became clearer and allowed watery solutions to spread over it. Eventually it was found possible to repair the fornices and she acquired useful vision.

He also found it most valuable in cases of the chronic pannus and superficial ulceration of the cornea which sometimes persists in trachoma after the conjunctiva has cicatrized.

The strength used has been from ten to forty grains to the ounce, according to the amount of reaction excited.

LUMPS IN THE NECK, WITH SPECIAL REFERENCE TO TUBERCULOUS CERVICAL ADENITIS.

In the *Interstate Medical Journal* for March, 1917, HAWES points out that the treatment of lumps in the neck naturally varies according to the cause. In all these conditions there are two methods of treatment, depending on the diagnosis. The first consists of treating the lump in the neck, and the second consists of treating the patient who happens to have the lump in the neck. In general, the treatment of these enlarged glands may be summarized as follows:

1. The treatment of glands due to chronic inflammatory processes is simple, and consists in removing the cause.

2. Syphilitic tumors or ulcers are likewise most amenable to treatment under antiluetic measures, once the diagnosis is made.

3. Carcinoma of the neck, whether primary or secondary, naturally presents a more or less hopeless problem. The primary focus as well as the glands should be removed if possible. In far too many instances treatment is of no avail, although x-ray and radium therapy may prolong life.

4. Sarcoma, malignant lymphoma, or Hodgkin's disease. The outlook is about the same here as with carcinoma. In these cases a correct diagnosis is essential because,

although an absolute cure is impossible, persistent radium or x-ray treatment under competent supervision may prolong years.

5. In leukemia radium and x-ray treatment may be of great help. In the majority of cases, however, treatment consists in making the patient as comfortable as possible.

6. The treatment of tuberculous cervical adenitis has undergone marked changes during the past five or ten years. In the year 1905, and in some places very much later than this, even up to the present, the treatment of tuberculosis of the glands of the neck was looked on as one of the most difficult and entirely belonging to the surgeon. A curious distinction was made, which I have never been able to understand, between the tuberculosis of the lungs, where it was looked on as a patient himself who was put under treatment and given the fresh air, rest, proper food, on which the cure of tuberculosis is known to rest, and those cases where the tuberculosis was not in the lungs but in the glands of the neck. Here the patient himself was apt to be entirely neglected, while the surgeon devoted his attention to the lumps in the neck, and endeavored by surgical measures—sometimes but far too often badly done—to remove the glands and to bring about what he considered would be a cure. Such "cures" were generally very temporary ones. In the majority of any large hospital will be seen repeated case after case operated on for "the removal of tuberculous glands of the neck" and discharged as "cured." If the recent history of many of these patients were followed, and at the Massachusetts General Hospital Hawes has had an opportunity of personally looking up many of these histories, it would be found that a large proportion were not radically cured in any sense of the word, but returned to the dispensary or out-patient department in a few months or years, or went to some other hospital, for further operation on the recurrence of the glands.

The routine procedure which is endeavored to have carried out in every

these cases which comes to his clinic at the Massachusetts General Hospital, or to him in private practice, is somewhat as follows:

First, find and, if possible, remove all sources of infection. This means a careful examination of the teeth, by x -ray if necessary, to reveal any hidden collection of pus around the roots, examination of the tonsils and adenoids, if present, and their removal if necessary, as well as a careful search everywhere for any infectious focus.

Second, operative measures.

In regard to surgical procedures, an operation may or may not be necessary, depending on:

1. The size of the glands involved, whether they are discrete and easy to be removed, or whether they consist of masses matted together and presenting a surgical problem of great difficulties.

2. Whether the general condition of the patient warrants an immediate operation, or whether, as is often the case, it is not better to remove the foci of infection and to build up the patient's general health before operation.

3. Whether the glands have broken down and begun to suppurate. If this is the case, operation under local anesthesia, consisting of a simple small incision large enough to allow of free drainage, but with no attempt to do anything radical, should be made, and the sooner the better.

4. Whether the standard of surgical skill available for the individual patient is a sufficiently high one. In far too many cases operation for the removal of glands of the neck is looked on as an easy and simple operation. Hawes's own experience makes him firmly convinced that it requires mature judgment, great technical skill, and long experience to do good surgery in such cases.

5. Finally, Hawes's decision as to whether he should call in a surgeon would depend on the finances and on the intelligence of the patient. If it were no hardship for the patient to undergo the longer period of treatment by general hygienic measures, tuberculin, etc., in the great majority of cases he should advise this. In justice to

the surgeon whom he should select to do an operation, should one become necessary, as well as to the patient, the surgeon should see the case at the beginning and be kept in touch with the patient afterward. In many cases he has advised an immediate operation among workingmen and women when he knew it could be skilfully done, simply because it took less time and in the long run cost less money than slower and more conservative though perhaps safer methods.

Third, general hygienic measures. The question as to how much each patient needs in the way of improved hygiene, fresh air, rest, etc., must naturally depend almost entirely on the individual case. Many of his patients, particularly among the children, are apparently in the most splendid health, and it seems absurd to demand increased or better food or any radical changes in their methods of living. Heliotherapy, or sunlight treatment, where it is possible to carry it out successfully, Hawes believes to be of the greatest benefit in all cases. In Massachusetts, at least, the New England climate—especially in the winter-time—practically rules this out. Outdoor sleeping is of great help when it is not a hardship. Four or five glasses of milk in addition to three good meals a day is all he ever demands in the way of increased food. A cool sponge bath down to the waist every morning is beneficial. Sundays, Saturday afternoons, and holidays should be spent in the open—out of town if possible. Plenty of sleep with windows open, when outdoor sleeping is impossible, is essential.

Fourth, tuberculin. During the past ten years, at the Massachusetts General Hospital, Hawes has had under his care nearly 500 cases of tuberculous cervical adenitis, and has used tuberculin in practically all. He can, at least, say with absolute certainty that in no instance has tuberculin done any harm. In a few instances he has been unable to see that it has done much, if any, good; in a large number he is willing to go so far as to say that he believes tuberculin has been a factor in the resulting improvement, while in a small, carefully selected group of cases he can go still further and

say that he is certain tuberculin has been the principal factor in the patient's recovery. He does not wish to be considered a "tuberculin enthusiast." If he had to drop any one of the four factors in the treatment of these conditions—elimination of sources of infection, hygiene, surgery, and tuberculin—he would prefer to do without the tuberculin first and surgery second, though it would be a close decision between these two. Likewise, he does not believe that tuberculin should be used by the general practitioner or surgeon. It should be kept in the hands of those who, from long experience and careful study, know its dangers and limitations as well as its value.

**REMISSIONS IN LEUKEMIA PRODUCED
BY RADIUM IN CASES COMPLETELY
RESISTANT TO X-RAY AND BEN-
ZOL TREATMENT.**

In the *Boston Medical and Surgical Journal* of April 5, 1917, ORDWAY states that the methods of administering benzol in the treatment of leukemia have now become almost uniform. Capsules, in certain instances coated with salol, containing 0.5 gramme of benzol, are given with equal parts of olive oil to diminish the irritating local effect. Two of such capsules are given at first, increasing until ten—that is, five grammes a day—are administered. They should be taken immediately after meals and never during meals, and it is important that the patient should be kept in the hospital during such treatment. It may take ten days to three weeks before the effect upon the blood is observed. It is customary to stop administering when the white count in leukemia has been reduced to 20,000. Boardman states that sixteen out of one hundred cases failed to show improvement, and that another eight cases, although reacting favorably at first, died during or soon after the discontinuance of treatment. Also certain toxic effects have been reported, such as gastrointestinal disturbances, headaches, dizziness, skin eruptions, bronchial and kidney irritation, and hemorrhages. Marked leucopenia with increasing anemia and death may occur.

The technique for treating leukemia by the Roentgen ray has been very variable, and this may account to a certain extent for the variations in the results obtained. Boardman (*loc. cit.*) states that the x -ray has produced improvement in from 20 to 50 per cent of the patients—that is, 50 to 80 per cent of the cases are refractory. In most cases the long bones as well as the spleen have been radiated. In many instances, however, too little attention has been paid to the principles of cross-fire and filtration (deep therapy). The principle of the so-called "cross-fire" is important for the successful application of radium or x -rays to large growths or to deeply seated lesions. The method was first described by Domenici and has since been elaborated by others, notably in the treatment of uterine fibroids by x -rays in the Freiburg clinic by Kroenig and Gauss. The aim is to concentrate as much of the action of the rays as possible in the deep-seated lesions with the least possible injury to the overlying skin. This may, in certain instances, be accomplished by employing small tubes of radium scattered throughout a tumor mass or by surface applications of heavily screened radium or x -ray to a large number of areas on the skin so that each area will not be exposed too long or too intensively. This might be the result in applying the radium to a single area for the time necessary to produce the desired effect on the underlying lesion. By this cross-fire method enormous doses, even 1000 to 1500 Kiemboeck units, may be applied to the deep lesion when not more than 20x could be safely put through one particular surface area. Pfahler uses from 4 to 40 surface areas and passes a full dose through each, making a total of from 80 to 800 units.

To produce any marked effect upon the deeper tissues it is necessary to use screens or filters to check the less penetrating rays which would otherwise be absorbed by the superficial tissues and cause marked destructive changes there before the less numerous and more penetrating rays could act on the deeper tissues. In order to obtain the most penetrating x -rays for this

method of so-called "deep Roentgen therapy," the well-known "Tiefenroentgen-therapie" of the Germans, it is necessary to employ a hard tube of high degree of vacuum and an electrical apparatus of high voltage. The rays are not all of equal penetrability, and it has been found that they are more homogeneous when the softer rays have been "filtered out" by an aluminum plate 3 millimeters in thickness. Certain roentgenologists also use a heavy piece of lead.

When radium is used for the treatment, screens or filters of lead 2 to 3 millimeters in thickness, of brass 1.2 millimeters, or other heavy metals such as silver, gold, or platinum, allow the penetrating hard beta and gamma rays to pass and intercept the soft alpha and soft beta rays which would otherwise be absorbed and cause destructive changes in the superficial tissues. As the amount of the more penetrating rays is only a small proportion of the total activity (less than 5 per cent), it is necessary in deep therapy to make exposures correspondingly long.

The principles of cross-fire as well as of surface therapy are made use of in the treatment of leukemia by surface applications of radium. The technique of such radium therapy may be illustrated by the striking effect of radium when applied in the proper manner to the surface over the enlarged spleen in cases of myelogenous leukemia.

When from 50 to 60 milligrammes of radium element or millicuries of radium emanation are employed, evenly distributed over a surface applicator 2x2 cm. in diameter, and the filtration above mentioned is used, the radium may be left in each position from four to six hours—four hours if there are 60 milligrammes, six hours if there are 50 milligrammes and if the filtration is 3 millimeters of lead. With this amount of radium and the above technique it is possible for complete remission in leukemia to occur with three series of treatments. Amounts of radium, however, as small as 25 milligrammes, even when this is in the form of a tube, have reduced the spleen to normal size, and have caused the

characteristic improvement in the blood and in the general condition of the patient, but the time required is longer and the series of applications more numerous.

It has been the practice of many roentgenologists to radiate the long bones as well as the spleen in cases of myelogenous leukemia. In the writer's experience, however, it has not been necessary or, indeed, seemed advisable, when radium is used as the therapeutic agent, to radiate the long bones. Surface applications of radium over the enlarged spleen in the manner above described produce most remarkable improvement, with striking changes in the size of the spleen, the blood picture, and the general condition of the patient. In the course of a few weeks, or in certain instances in three or four months, after radium treatment by surface application a spleen which filled almost the entire abdomen and extended well to the right of the median line and into the pelvis and caused marked pressure symptoms has been reduced to normal dimensions so that it was not palpable below the costal margin. The white cells in the blood were reduced from 500,000 to 6000, the immature forms being especially affected. The hemoglobin increased from 60 or less to 90 per cent. Red blood-corpuscles may increase from 2,000,000 to 5,000,000. The abnormal blood cells, myeloblasts, and myelocytes disappear. Indeed, the blood picture returns almost to normal, although some variation in the size of the red cells may persist and there may be relative lymphocytosis. A pale, emaciated, anxious individual with prominent bony framework, stooping shoulders, and enormously enlarged abdomen usually loses the anxious expression, becomes plump, the abdomen returns to normal size, and the color and strength improve so that the patient may feel entirely well. The pathological condition, however, sooner or later is apt to relapse, and response is less prompt in subsequent series of radium treatments. Some of the patients treated with radium have been followed for a number of years and kept in good condition by the occasional repeating of radium treatments. Certain

cases, however, similarly treated have died of intercurrent infection or have succumbed to the original disease.

Conclusions.—(1) Surface applications of radium in leukemia produce striking, indeed remarkable, improvement in (a) the blood picture, which becomes almost normal; (b) in the size of the spleen and glands, which are reduced almost to normal; (c) in the general condition of the patient, who from an emaciated and weak condition may become plump and strong. (2) The duration of remission is variable: it may last from months to years. (3) The results of radium treatment are not regarded as curative. It is believed to be, however, the safest as well as the most prompt palliative measure in cases of chronic leukemia whether refractory or not to benzol or x-ray treatment. From the results of radium therapy in leukemia it is believed to be the best form of treatment now at our disposal.

ECLAMPSIA AT THE BOSTON CITY HOSPITAL: A REVIEW OF THE CASES OF TWENTY-THREE YEARS.

In the *Boston Medical and Surgical Journal* of April 5, 1917, YOUNG gives us the results of operative and non-operative treatment on both mothers and children. In looking over the records, the writer often finds it difficult to differentiate between mothers dying of toxemia and those already weakened who perished from the shock of delivery. The number of convulsions, pulse-rate and blood-pressure are not by any means infallible guides as to how an eclamptic will bear operative delivery, and the writer, watching the results of the various methods, has changed his opinions somewhat regarding immediate delivery by heroic measures. Many apparently hopeless cases survive a long operative delivery; and some, in apparently the same condition, fail to recover after very simple procedures. Under all circumstances the shock of an operative delivery is considerable, although many of those so delivered would doubtless

perish under any form of treatment. usually in the milder cases that more and prolonged methods of delivery are to be employed, although they appear the experience of the writer, equally effective, if not more necessary, in the severe cases under discussion.

Owing to the serious condition of these patients, the milder rather than the more immediate and strenuous method seem better suited for their delivery. The latter should be used only when the former appear inadequate. Some patients may possibly be lost by delay, but many will be saved by the avoidance of shock.

In primiparæ (except in the very early months), both where labor has not started and where there is partial dilatation of the rigid os, most serious cases may be delivered by the use of the dilating agent while in multiparæ they are often more effective. By this means we are imitating the processes of nature by which the best results in delivery appear to be attained.

Whether the irritation of the bag of membranes of the uterus tends to continue or to excite convulsions is a question upon which the writer is as yet undecided. Most excellent results have been obtained by their use in desperate cases, and there have been many favorable results as well.

Although delivery is lengthened in the use of the bag there is much less shock, less liability of laceration of the cervix, and less chance of sepsis, even though manual dilatation is used to complete the task. A rigid os frequently softens, and manual dilatation, if necessary, is more readily accomplished. The fact should be pointed out that in the hees bags alone were used in some cases for operative delivery.

For the vaginal Cæsarian section, as a means of immediate delivery, the writer sees no advantage in the clean case advanced beyond six months, since the operation is difficult in primipara under these circumstances. In multiparæ it is difficult, if the cervix is high in the pelvis. After the uterus is opened the labor may still be ended by forceps or version.

the repair is long and tedious. There were but four cases in this series, three of which were operated *in extremis* and fatal; one dying on the table.

Abdominal Cæsarian section has been performed once. The writer believes it proper in certain cases in which immediate delivery appears necessary and other methods seem too prolonged, uncertain, and difficult, because of the size of the child or the condition of the cervix.

The relation of blood-pressure to prognosis and treatment is a matter of great interest in the severe types; but the available data are too small for absolute conclusions. Of 42 cases with data available, 12 died. Three died out of seven with a pressure of 200 or over; nine others died with pressures varying from 104 to 160; while 30 cases, varying from 210 to 106, and with an average systolic pressure of 157, all recovered.

The methods of delivery were so dissimilar that no comparison could be made to show the influence of any special method of delivery upon results.

High blood-pressure makes the outlook less hopeful, but does not necessarily mean a fatal outcome. Diminution of pressure after delivery is a hopeful sign.

The number of venesections is too small for reliable statistics, especially concerning a procedure where judgment as to worth depends so much on an intimate knowledge of the individual case. It has been tried in the cases with high pressure and usually in severe types after delivery.

There were 18 venesections, nine of whom recovered and nine died. Six of the nine mortalities were in cases received post-partum, and two of those which recovered were likewise admitted after labor. One patient died undelivered.

In antepartum venesection the writer has little faith, except in certain plethoric individuals, and believes it should be employed with the greatest care at this stage. It is not possible to foretell either the amount of blood which will be lost during birth or the reaction of a toxemic patient to the strain of delivery.

Venesection is often of great advantage in the strong, healthy, full-blooded, restless individual, in whom blood-pressure remains high or has a tendency to rise after delivery; but in those who are frail or fat and flabby its advantages are very doubtful. Loss of blood lowers the resistance to infection, to which all cases of toxemia of pregnancy are very susceptible.

During bleeding the blood-pressure should be carefully watched and not allowed to fall below normal; while to all cases of venesection fluid should be administered either by rectum or by hypodermoclysis where the first method is not available. Additional fluid is not required by patients with edema of the tissues.

The medical treatment has been along the usual lines—free catharsis, gastric lavage, control of convulsions by sedatives and ether, enteroclysis, hypodermoclysis, and hot packs in some cases. Sweating has not been used so often during the latter years. It has appeared to be of doubtful efficacy, and distinctly detrimental to some.

The fact that patients, too sick for safe operative delivery, sometimes recover under medical treatment is often forgotten in the desire to obtain immediate results. The Voorhees bag may be advantageously combined with medical treatment. There are a number of cases in the present series in which delay in obstetric surgery has been followed by recovery, when operative measures would have been fatal for the mother. Each case must be considered by itself and no general rule can be applied, except that the method adopted for delivery should be the gentlest and most efficacious for that individual.

From what has gone before it is clear that results with the class of cases received in their wards cannot be as good as one would wish, but are about what might be expected. On the whole the mortality seems to be lessening. Unfortunately this cannot be ascribed to treatment alone, as the severity of eclampsia varies in different years.

This series is published in the hope that it may aid in some larger collection of cases.

The conclusions reached have been deduced from a study of the cases and are not all capable of proof by statistics alone.

1. Incidence varies greatly in different years and without apparent cause.

2. Severe attacks occur mostly in primiparæ from twenty to twenty-five years, in the latter half of pregnancy.

3. A little over one-half the cases with convulsions have seizures after delivery.

4. Non-operative delivery is most favorable for the mother.

5. The longer the convulsions continue, the greater the mortality.

6. Child mortality is high whether deliveries are operative or non-operative, owing to prematurity and toxemia.

7. High blood-pressure increases the gravity of the prognosis.

8. Venesection is a useful procedure in cases with high pressure and restlessness after delivery.

9. Induction of labor and delivery with the least possible operative interference offer the best chance of recovery for the mother.

10. Cæsarian section is justified in certain cases in which delivery by other methods seems too prolonged or doubtful in outcome.

INFANT STOOLS AS DIAGNOSTIC AIDS TO THE GENERAL PRACTITIONER.

WESTON writing in the *Southern Medical Journal* for March, 1917, states that green is the most usual abnormal color seen, and is generally due to either excessive acidity or alkalinity changing the bilirubin to biliverdin, or to the bacillus pyocyaneus. A stool changing from yellow to green has no significance. A very dark-green stool is significant of disease. When the color is due to bacterial action the addition of nitric acid decolorizes it. If due to biliverdin, the addition of nitric acid produces a prismatic play of colors.

The next most common abnormal color is gray. When the stools are gray at birth, or become so shortly after birth, the cause is usually a congenital obliteration of the bile ducts, or an atresia or obstruction in the

intestines. When associated with the trouble is usually in the duodenum. The most usual cause for the gray color is in some form, probably soap, and the absence of bile. It must be remembered, however, that this color is not inconsistent with the presence of bile, since the bile may be present in the form of the colorless hydro-bilirubin. The presence of bile may be detected as follows: A small amount of feces is stirred up in water and a few drops of the resultant mixture treated with an equal amount of a saturated aqueous solution of bichloride of mercury. A green color denotes the presence of bile pigment.

Stools that are white are due to the presence of undigested fat in the form of fecal matter.

When the stools are black the color is due either to blood or to some drug, probably bismuth.

Sometimes a stool is seen that is greenish blue in color and is of no particular significance, being due to some change in the intestinal pigments.

Occasionally around the edge of the stool is observed a pink stain. This often occasions some anxiety on the part of the mother. This is caused by some change in the bile pigment and is of no significance.

The odor of the stools of fat indigestion has a strong scent of butyric or lactic acid.

Protein indigestion produces an odor of putrefaction. Indigestion caused by carbohydrates gives the odor of lactic, acetic or succinic acid.

When there is an excess of fat the reaction is acid, and when there is a relative excess of proteins the reaction is alkaline. When carbohydrates are in excess or there is fermentation of the carbohydrates from bacterial activity the stools become acid. Frothy stools are the result of carbohydrate fermentation or the rapid decomposition of protein, and in either case are acid in reaction. Stools that irritate the buttocks are invariably acid in reaction.

The reaction of the stools is best determined by placing wet red or blue litmus paper on the fresh surface of the stool. When nitric acid is added the color becomes more distinctly brown, the reaction usually acid, and

stools have an aromatic odor. If the starch is derived from oats the stools may become loose, while if from barley the tendency is toward constipation. The specks so often seen in the stools of infants taking either oatmeal or barley starch are husks, and must not be confused with grains of sand, as is so often done.

When animal broth is added to the infant's food the stool is brown in color, the odor fecal, and the reaction alkaline. When an animal food is given as a meal to an infant, and the following meal is a milk mixture, it is not unusual for the stool to present two distinct colors, definitely separated.

The most usual abnormal constituents are curds. These may be composed principally of fats or of casein. The casein curds are usually much larger than the fat curds, are firm and tough, and cannot be broken up by pressure. They sink when placed in water, are insoluble in ether, and when placed in ether become as hard as a stone. The fat curds are usually small, varying in size from mere specks to a small pea. They may be either white, yellow, or green. They are soft and are easily broken up when pressure is applied. When placed in water they tend to remain in suspension. After acidification and heating they are soluble in ether, and are unaffected by formalin. Sometimes when the stool appears greasy, and a portion is pressed against paper and dried, if the appearance is due to fat the paper remains as if oiled.

When mucus is mixed with the stool its origin is usually the small intestine; when in combination with a gray-colored stool its origin is the duodenum; when on the outside of the stool, from the rectum. Stools composed of blood and mucus indicate either a disease of the colon or intussusception. Undigested starch may be mistaken for mucus. By the addition of iodine the starch may be distinguished from mucus, as iodine when in contact with starch stains blue and does not affect mucus.

Blood on the outside of a firm stool indicates a fissure of the anus. Hemorrhage from the bowel in the first few days of life

is usually a symptom of hemorrhagic disease of the new-born; when appearing later, of intestinal polyp.

Pus is seen usually toward the end of an attack of a severe inflammation of the large intestine.

The macroscopic examination of the stools is usually sufficient in the great majority of cases. The microscopic examination is necessary in order to detect ova of intestinal parasites and the amount of undigested starch and fat. For the purpose of examining for intestinal parasites it is only necessary to dilute the stool with a few drops of water and spread it out on a slide. For examination for starch, a small portion of the stool is stained with Lugol's solution. The starch granules stain violet or blue. For fat, stain a portion of the stool with a saturated alcoholic solution of Sudan III. The neutral fat drops and fatty acid crystals stain red. Soap crystals do not stain with Sudan III. After getting the above picture thoroughly fixed in mind, a drop of glacial acetic acid is allowed to run under the cover-glass, and placed over a flame until it merely simmers. This procedure converts the soap into neutral fats and fatty acids which appear as large red-stained drops. These crystallize upon cooling. Any increase in the amount of fat after the above procedure indicates the presence of a corresponding amount of soaps.

For the detection of the gas bacillus, which is of the utmost importance in determining the course of treatment in infectious diarrhea, the following procedure is recommended by Morse as simple and easily done: A small portion of the stool is added to a test tube of milk. The infected tube is then placed in a water-bath and allowed to boil for three minutes. The tube is then placed in an incubator at body temperature and kept there for from 18 to 24 hours. The object in keeping the tube in the boiling water-bath for three minutes is to destroy the spore-bearing organisms. When the gas bacillus is present the casein is largely dissolved; the residual casein is somewhat pinkish in color and filled with small holes; and the odor is much like that

of rancid butter, as the result of the formation of butyric acid by the gas bacillus. Gram-stained preparations made from milk show rather thick, short Gram-positive bacilli, with slightly rounded ends.

MODERN ASPECTS OF HEART DISEASE.

SUTHERLAND in the *Lancet* of March 31, 1917, states that the term "cardiac tonic" is still in common use and is employed somewhat indefinitely. It is applied to drugs which are supposed to stimulate or increase the contractile power of the heart. Some cardiac tonics are supposed to act directly on the musculature and others through the nerves of the heart. If one takes a list of the so-called cardiac tonics and tries to ascertain the exact action of the individual drugs it will be difficult to state precisely what special result is to be looked for. Digitalis and its allies, strophanthus and squills, stand apart from the others in this respect.

Balfour (1897) held that the fundamental action of the digitalis group was to increase the elasticity of the muscular fiber of the heart, so that it expanded more slowly and contracted more perfectly. Broadbent (1897) considered that digitalis caused a more complete expulsion of their contents by the energetic contraction of the ventricles, and also improved the suction action during diastole, thus withdrawing the blood which had been dammed back in the veins. Brunton found that digitalis acted on the cardiac muscle, on the intrinsic cardiac nerves, on the vagus center in the medulla, and also on the arterioles. Sutherland does not find any clinical proof of the accuracy of these views. There was no precise knowledge of the underlying changes in cardiac failure which digitalis is specially fitted to remedy. Each authority seems to draw his conclusions from few and imperfect observations, or even to make his observations for the purpose of supporting his previously formed conclusions. In many cases what would now be regarded as the outstanding changes in cardiac failure were relegated to an entirely subsidiary position.

It is interesting to note that twenty years ago the special symptoms which call for digitalis had been recognized. They may be summed up as cyanosis and dropsy, a rapid, irregular pulse and breathlessness. This condition is most frequently accompanied by auricular fibrillation, and is still the type in which the action of digitalis is most clearly demonstrated. Digitalis was then regarded as a cardiac tonic, and having been found beneficial in this special type of case it was to be used indiscriminately in all forms of severe illness with cardiac weakness. Sutherland was house physician in the days when it has been regarded as almost criminal to let a patient die without giving digitalis, whether the disease was pneumonia, typhoid fever, or pernicious anemia. He believed that digitalis was the great cardiac tonic, and always suitable if cardiac failure was present. Other cardiac tonics and stimulants have had their day, and are still used by those who believe they have seen good results follow from their use. Amongst the drugs which may be mentioned strychnine, camphor, adrenalin, and pituitrin, the exact mode of their action on the heart, if any, has not been determined, and the type of case suitable for their application has not been clearly differentiated. Digitalis, however, holds its own in the present as in the past.

Progress has been made, and although differences of opinion may still exist, the answers are a good deal nearer the answers to the questions why to use digitalis, when to use it, and how to use it. The progress of scientific medicine is often delayed by the existence of unscientific beliefs, and the employment of digitalis in heart disease is an illustration. The one outstanding question about the action of digitalis which has been fully established is that it slows the action of the heart under certain conditions. Sutherland proposes to consider how the slowing is brought about; what effect it has on the flow from the slowing; and whether the ascertained beneficial effects from digitalis are not to be explained solely as the result of this cardiac slowing. In doing this an attempt is made to dispute the

effects on the cardiac muscle obtained by physiologists and pharmacologists in their experimental work with large doses of digitalis. The pharmacologist cannot produce in animals those changes in the tissues and functions of the heart which are the result of disease, nor can he form any estimate as to what the results of digitalis in therapeutic doses will be in the treatment of cardiac disease.

In ordinary language slowing of the heart means slowing of the rate of contraction of the left ventricle, and this is estimated clinically by the pulse-rate or, if necessary, by auscultation of the heart. An increase in the ventricular rate or a serious disturbance of the cardiac rhythm is never primarily ventricular in origin. The ventricle follows but does not lead the cardiac rate or rhythm, which is always initiated in some part of the supraventricular tissues. In diseased conditions an increase of rate or a disturbance of rhythm is also started in the supraventricular tissues. Consequently it would appear that treatment should be directed to the supraventricular tissues from which the disturbance proceeds.

Here are two further points to be considered: First, it has not been shown that digitalis in medicinal doses—and we are dealing solely with digitalis as a therapeutic agent—has any direct effect on the wall of the left ventricle. Consequently we must not assume that digitalis acts on the ventricular muscle. Secondly, it has been shown that the slowing action of digitalis is through the vagus nerve, but it has not been shown that the vagus has any direct action on the musculature of the left ventricle. Assuming them to be true, we draw this conclusion—that digitalis slows the rate of the left ventricle without acting on the ventricle; and that it produces its effect through the vagus nerve, which also has no direct action on the left ventricle. It therefore follows that as the rate of the left ventricle is dependent on impulses proceeding from other parts (the supraventricular tissues), the action of digitalis through the vagus must be on these supraventricular

tissues. In an attempt to slow the ventricular rate through the supraventricular tissues, there are two possible lines of action: (1) to check the rate of impulse discharge at some overacting center, or (2) to block some of the rapid contractile impulses in the conducting tissues so that a diminished number of them reach the ventricle. Clinically it can be shown that in slowing the heart-rate this is the mode of action of digitalis.

SYDENHAM'S CHOREA WITH SPECIAL REFERENCE TO TREATMENT.

In the *Ohio State Medical Journal* of April 1, 1917, DANIEL and LAMBRIGHT state that from their experience they are led to believe that the tonsils very frequently contain the source of trouble in chorea.

The greatest care as to oral hygiene should be exercised. Decayed teeth should be taken care of properly, and if there are any alveolar abscesses they should be drained.

Discharging ears are sometimes the source of trouble and should be carefully treated. In some of these cases autogenous vaccines are of service.

Sometimes it is the intestinal canal that is letting the toxins and bacteria into the system and calls for treatment. Here daily irrigations should be employed. The use of lactic acid cultures has been of value.

There is an undoubted relationship between acute rheumatism and chorea. The question naturally arises regarding the application of antirheumatic remedies in this disease. It is not difficult to understand why the results have been discouraging when we consider that the toxins and cocci are in the cerebrospinal fluid and brain tissues and realize the small amount of salicylates excreted into the cerebrospinal fluid. The combination of the alkalies with the salicylates appeals to one as rational and has been shown to be of great advantage. There is a probability that they act by neutralizing the acid toxins of the bacteria.

Arsenic has been looked upon as a specific. The introduction of salvarsan into

therapy brings up the question of the application of the remedy in this disease. Arsenic was used empirically as a general nerve tonic as long ago as 1780 by Alexander. Pawlow, von Bakay and Pierre Marie have used salvarsan and report favorable results. We are certainly able to get enormous doses of arsenic into the system by the use of this drug. On this account where arsenic is indicated, especially in intractable cases, its use is feasible. Milian argues that there is a luetic factor in a great many of these cases, and on this account the therapeutic results in some of them may be explained.

The symptomatic treatment is a very important part. The patient should be placed at rest with isolation from influences which tend to excite. Schoolchildren who develop chorea should be immediately withdrawn from school and about the streets. It is well not to allow a child to read or to exert its mind. Careful diet should be instituted and the bowels regulated. Toxic foci if located should of course be removed before this treatment is instituted. For the motor restlessness hydrotherapy offers the best results. Occasionally chloral, bromides, hyoscyamus, or small doses of morphine are demanded in the severe cases.

Recently Mayer has reported a series of cases in which he injected a small amount of one-per-cent phenol solution intravenously. The results according to his report have been good. This is a new treatment and it is too early to judge of its efficacy.

We must always keep in mind that in a large majority of cases there is a myocardial involvement. The great damage that may be done by overexertion is well known.

Suffice it to say that prolonged rest with ice-bag to chest should be insisted upon. Whenever there are signs of cardiac decompensation the routine treatment for that condition should be carried out.

Poynton and Payne recently issued instructions which should be given to parents of rheumatic children which might well be applied to cover chorea. The instructions are as follows:

1. The importance of proper clothing.
2. The care of sore throats.

3. The necessity of attention to gro pains.

4. That nervousness, clumsiness, night terrors are often warnings of ch

5. That patients should be warned signs of heart disease are few, and shortness of breath is by far more com than pain.

6. Much emphasis should be laid o need for patience when the child is r ering from this disease.

7. Parents should be told that rhe tism and chorea are liable to recur.

THE PRINCIPLES OF THE TRANSFUSION OF BLOOD.

STANSFELD in the *Lancet* of March 1917, reaches these conclusions:

1. Transfusion has been successfully employed in the treatment of various kinds of anemia and in the arrest of spontaneous hemorrhage. It has also yielded promising results in cases of serious infection and certain toxemias.

2. The ultimate prognosis in cases of anemia depends upon the power of regeneration in the bone-marrow, and this can only be adequately determined by observing the results of treatment.

3. In cases of pernicious anemia the increased red-cell production and diminished red-cell destruction may result in transfusion.

4. In cases of pernicious anemia the condition of the patient, the duration of the disease, and the condition of the bone-marrow as indicated in the peripheral blood have all proved to be the best guides to the progress subsequent to transfusion.

5. The optimum dosage for transfusion is not yet determined, but it is probable that moderate repeated doses are preferable to large single doses in the treatment of chronic anemia. Very small doses are sometimes of value.

6. The donor should be a healthy person with negative Wassermann reaction. The serum of the donor should not agglutinate the corpuscles of the patient, and the serum of the patient should not agglutinate

puscles of the donor. Agglutinins should be excluded by tests done immediately before the transfusion, and a single examination is not sufficient to establish the compatibility of two bloods on all future transfusions. If agglutinins are absent, hemoglobins will also be absent.

8. If there be great urgency and testing of the blood of patients and donor be impracticable, a small preliminary transfusion could be done half an hour before the main mass of blood is transfused, so that gross incompatibility may be recognized in time. 9. Febrile reactions occur after about 25 per cent of transfusions, even though the bloods of donor and patient have been proved to be "compatible." Rigors occur in about 10 per cent of the cases.

10. It may prove desirable to investigate the blood of donor and patient with regard to factors of which we as yet know nothing, not merely for the sake of avoiding accidents, but also to determine whether a given donor is likely to afford the maximum benefit in a particular case.

11. The indirect method of transfusion, employing a glass receiver and sufficient sodium citrate to prevent coagulation of transfused blood, is simple and involves no special dangers.

MERCURIALIZED SERUM AND BICHLORIDE OF MERCURY.

In the *New York Medical Journal* of January 27, 1917, PITTENGER reaches these conclusions:

1. Mercurialized serum, whether injected intramuscularly, intravenously, or intrathecally, is equally as toxic as corresponding amounts of plain bichloride of mercury.

2. The addition of an excess of serum to bichloride of mercury does not reduce its toxic properties, but merely deprives it of the property of destroying tissue by precipitating and then dissolving the albumin of the tissue, without changing its toxicity or therapeutic efficacy.

3. Intramuscular or subcutaneous injections of mercurialized serum are practically painless and are not followed by sensitive-

ness, pain, and sloughing, which usually accompany injections of the plain bichloride.

4. Intravenous injections of mercurialized serum are not followed by pain or sensitiveness at the site of injection.

5. Overdoses of mercurialized serum when administered intravenously produce the same untoward effects, such as blood in the stools, vomiting, retching, markedly increased and troubled respiration, etc., as plain bichloride of mercury, and care should be used, therefore, not to produce toxic effects by overdoses or administration at too frequent intervals.

6. Mercurialized serum in proper doses may be safely injected directly into the spinal canal.

7. In systemic syphilis very favorable results can be obtained by the intramuscular or subcutaneous injection of mercurialized serum.

8. Intramuscular or subcutaneous administration of mercurialized serum is to be preferred in the treatment of systemic syphilis, except in patients in whom quick results are imperative, in which case the serum may be administered intravenously.

PARAFFIN TREATMENT OF BURNS.

The *British Medical Journal* of April 28, 1917, recalls the fact that the paraffin treatment of burns was introduced by Dr. Barthe de Sandfort (*British Medical Journal*, July 29, 1916, p. 153), who used a proprietary article to which the name "ambrine" was given. This is, we understand, used in the navy; but judging from the paper by Lieutenant-Colonel A. J. Hull, F.R.C.S., R.S.M.C., the formula he recommends gives as good results. It is as follows:

Betanaphthol.....	0.25	per cent.
Eucalyptus	2.0	" "
Olive oil.....	5.0	" "
Hard paraffin.....	25.0	" "
Soft paraffin.....	67.75	" "

Colonel Hull recommended that it should be applied with a broad camel-hair brush sterilized in wax. Dr. Barthe de Sandfort prefers to put ambrine on with a spray, and this practice is followed in the navy for the

first coat at least. In using a spray the paraffin must be at a temperature of about 50° C. (122° F.). We are indebted to the Director-General R. N. for particulars of the spray used. The barrel is made of solid drawn brass tube 2 inches in diameter and 4 inches long. A brass stiffening ring is fixed inside the barrel to form a seating for the cover. The cover is fixed so as to be readily made air-tight, either by a bayonet



catch, as shown in the illustration, or by a course screw. The height over all is 4½ inches. A wooden handle is fixed 3 inches from the bottom. The nozzle is made to screw off for easy cleaning. A capillary tube leads from the nozzle to the bottom of the barrel; it is well curved, and allows a cleaning wire to be easily passed through. The necessary air pressure is obtained by an india-rubber spray bellows of suitable size.

THE THERAPEUTIC USE OF THE EXTRACT OF CORPUS LUTEUM.

In the *Medical Record* of May 19, 1917, HAPPEL states that in a case of headache following the menopause, due to insufficient internal secretion of the ovary, the extract of corpus luteum is a specific.

Extract of corpus luteum must be given over a long period of time and in sufficient dosage, according to the needs of the patient. It produces no toxic effect, except a feeling of fulness of the head or vertigo, and is not cumulative.

It is the best remedy for the relief of the nervous symptoms of the natural menopause, and for their prevention and relief in postoperative menopause.

It is of the greatest value in the treat-

ment of irregular or scanty menstruation in young women and alleviates the neurasthenic symptoms so often associated.

It relieves dysmenorrhea in young girls and nulliparæ not due to a pathological lesion.

Benefit in nausea and vomiting of pregnancy has been reported.

The only disadvantage is the cost, which precludes its use in many cases in which it is strongly indicated.

THE TREATMENT OF CARRIERS OF ENDAMEBA HISTOLYTICA WITH OIL OF CHENOPODIUM.

In the *Journal of the American Medical Association* of May 19, 1917, WALKER and EMRICH give their results when forced by circumstances to use an oil of chenopodium which had been kept exposed to tropical light and temperature for over a year, and had undoubtedly lost some of its potency. The treatment found most effective by them consists of (1) magnesium sulphate, from ½ to 1 ounce, at 6 A.M.; (2) oil of chenopodium 16 minims in gelatin capsules at 8 A.M., 10 A.M., and 12 M.; and (3) castor oil 1 ounce containing chloroform, 50 minims, at 2 P.M. This dosage is for adults; for children it should be reduced according to age. The administration of oil of chenopodium in gelatin capsules obviates all the disagreeable odor and taste of the oil.

There are, however, several essential factors in the treatment which need careful consideration. One of these is the preliminary purgation with magnesium sulphate, which is a very important part of the treatment. The purpose of this is twofold: first, to remove the excess of fecal matter from the intestine which envelops and protects the endamebas and dilutes the chenopodium; and second, and most important, to bring the endamebas out of their protective cysts and subject them in the vegetative condition to the action of the chenopodium. Walker's and Emrich's experiments have shown that this preliminary purging should not merely consist of the routine administration of the salts, but should also secure

the fluid bowel movements before the chenopodium is given, to be a most essential factor for successful treatment. Indeed, the success or failure of any method of treating endameba carriers with encysted amebas in the intestine may depend on preliminary purgation to get the endamebas in the unprotective vegetative stage. Secondly, the chenopodium must be administered while the stools are fluid—that is, at short interval (two hours) after the purgative—in order that it may reach the amebas while they are still in the vegetative stage. Finally, the stools of the patient must be examined repeatedly after treatment by one capable of identifying *Endameba histolytica* in the resting and encysted as well as the motile stages.

These preliminary experiments indicate a method for the treatment of carriers of *Endameba histolytica* oil of chenopodium is worthy of further investigation. They should be confirmed by further experiments in which fresh oil of chenopodium is used with careful attention to technique. With especial reference to the preliminary purgation, and to more extended stool examinations after treatment to insure permanence of the cures.

INTRAVENOUS INJECTION OF SODIUM BICARBONATE IN DELAYED CHLOROFORM POISONING.

In the *British Medical Journal* of April 1917, FARQUHAR tells us that he removed a gangrenous appendix from a soldier who had been gassed. The anesthetist died with ether, as chloroform is avoided at the Darlington Hospital in acute appendicitis, and also in cases in which there has been starvation or vomiting for some days before operation. It was soon found, however, that ether was dangerous in this case, causing extreme cyanosis and profuse bronchial secretion, owing probably to the bronchitis that still remained from the "gassing," and it was decided to continue with chloroform, which the patient took well.

Next day the temperature had fallen, the pulse was good, there had been little or no

vomiting, the abdominal condition was quite satisfactory, and the patient seemed much better and was reading the newspaper on Farquhar's arrival. He had been getting sodium bicarbonate by the mouth and was taking fluids well.

Two days after the operation the house-surgeon reported that the patient was very sleepy, and was beginning to get jaundiced. Calomel and enemata were given, but the drowsiness increased. On the third day he was very yellow and in a state of coma, from which he could not be roused; it was accompanied by restless movements of the head and body when attempts were made to examine the pupils or to pass the catheter. Urine and feces were passed involuntarily, and no specimen was procured to be tested for acetone and diacetic acid. To all the surgeons who saw him the diagnosis seemed obvious—secondary chloroform poisoning—and the outlook hopeless. His relatives had come from another town to see him, but he could not be roused. Hoping for a temporary rally, Farquhar decided to inject intravenously a solution of sodium bicarbonate, as recommended by Langdon Brown in diabetic coma.

The incision was unnoticed by the patient, and two pints of sterile water containing five drachms in all of sodium bicarbonate were injected into the median basilic vein. Before leaving the table the patient drawled out the words "Oh, I say," again and again, but still could not be roused, and continued to pass urine and feces unconsciously until the next day, when a slight return to consciousness was noticed, and he tried to answer questions, but at first with no sign of understanding them. A pint of sodium bicarbonate solution was given subcutaneously every six hours and also occasionally by the rectum.

Two days after the intravenous injection the return to consciousness became more marked and he began to talk a little, but seemed childish. On the third day the mental condition was practically normal. The appendix wound healed by first intention, but convalescence was delayed somewhat by an abscess in the pectoral region

caused by the repeated subcutaneous injections, when the patient was restless, making it difficult to avoid sepsis. Otherwise recovery was uneventful and complete.

The interest of the case lies in the fact that recovery took place even after the onset of coma with involuntary passage of urine and feces. In most cases of delayed chloroform poisoning (of which Farquhar has, unfortunately, seen several) the pulse is rapid and weak, the patient is breathless before the onset of coma, and death is almost certain when this stage is reached. Whether intravenous injection of sodium bicarbonate solution can avert a fatal ending in any of these is doubtful, as in the case recorded above the pulse was never weak and running, but the treatment is, at any rate, worth a trial.

THE MODERN DIAGNOSIS AND TREATMENT OF SYPHILIS.

In the *New York Medical Journal* of May 12, 1917, THOMAS and BARNETT lay down the following conclusions or rules:

1. The treatment of syphilis, notwithstanding the promise of salvarsan and its substitutes, judged from the excellent serological results, extending in many instances over several years, remains in a sense empirical.
2. The ultimate proof of cure does not rest necessarily upon the continuous negative Wassermann reactions for one, two, three, five, ten, twenty, or even forty years, but rather upon complete freedom from symptoms for a generation or more.
3. The Wassermann reaction furnishes the best control of treatment and is the most reliable index of cure subsequent to proper treatment.
4. The sheet-anchor in the treatment of syphilis is no longer mercury, but salvarsan, neosalvarsan, or one of their substitutes. It is of paramount importance, however, that the injections of arsenobenzol in the beginning be administered as early as possible and intensively in full doses commensurate with the physiological tolerance of the patient, not scattered indefinitely over

months, interspersed here and there with the Wassermann test. In view of the probability of immediate cure by this drug early administered in the primary if not in the secondary and latent stages of the disease, the treatment of syphilis, particularly in the chancre period, prior to the advent of a positive Wassermann, becomes an emergency operation, in many instances more imperative than the administration of antitoxin in diphtheria. Their experience indicates, as a reliable routine, two injections of salvarsan in the early chancre stage; and three injections in the late primary stage throughout the secondary or latent stage of the disease; and during the tertiary stage of the hereditary forms of syphilis not fewer than four to six injections, supplemented by mercury and the iodides. If, after such treatment, the Wassermann still remains positive, a second series of injections should be administered.

5. Serologically judged on a three- to a five-year duration, syphilis, in the chancre stage, if diagnosed early, either clinically or if necessary by either the field microscope or the Wassermann reaction, may be cured by two injections of salvarsan or neosalvarsan; indeed, if the diagnosis is made, particularly before the development of a positive Wassermann, one dose of either of these drugs may be sufficient.

6. Secondary syphilis seems to do just as well without as with mercury, provided enough salvarsan or neosalvarsan is administered to produce a negative Wassermann.

7. The serological results in tertiary syphilis treated intensively with salvarsan and its substitutes are not so brilliant as those of the secondary period.

8. The French preparation of arsenobenzol and the Canadian diarsenobenzol are excellent products and may be just as efficient as salvarsan and neosalvarsan, in spite of account of their greater tendency to produce toxic phenomena are not destined to supersede the original German products. Like arsenobenzol, owing to its lesser potency, the reduction of the Wassermann reaction must be regarded as inferior to the German products.

9. The arylarsonate "soamin" and sodium cacodylate, both clinically and serologically, have no place in the effective treatment of syphilis.

10. Sociologically, in view of the fact that less than twelve per cent of our hospital syphilitics return for treatment until discharged cured, a problem is present which urgently demands the coöperation of our civil authorities and health boards for the necessary control and treatment of this disease, not, however, to be realized until all hospitals receiving State aid are compelled to maintain evening dispensaries with paid attendants for the proper treatment and admission, when necessary, of venereal patients.

THE REPLACEMENT OF MORPHINE IN SURGICAL PRACTICE, WITH A REPORT OF 110 CASES.

In the *Long Island Medical Journal* for May, 1917, SCHALL gives these results from clinical tests on pantopon:

He replaced morphine medication in the surgical wards by using pantopon.

The sedative effect of pantopon was very noticeably greater than that of its morphine equivalent. Respiratory and cardiac depression were far less marked than when morphine was used.

Postoperative nausea or vomiting and constipation were very much reduced through the new method of procedure.

Intestinal stasis or paralysis and anuria were not observed in a single case. Patients suffered no inconvenience when administration of pantopon was discontinued.

THE TREATMENT OF ASTHMA.

GEYSER in *American Medicine* for April, 1917, gives this advice as to the treatment of asthma:

With a faradic current examine the spine. Certain areas will be found that are hypersensitive to the current. A red spot usually appears in such areas. Apply one pole of the faradic current over the red or hyper-

sensitive spot or spots, the other a large pad electrode over the entire lung area anteriorly. The interruptions at the vibrator point must be at least 5000 or more per second. After applying this current for 15 to 20 minutes the spasm will be relieved and stay so for a number of days. By repeating this treatment daily or even on alternate days for two weeks, the patient will be free for months.

THE VALUE OF FEEDING DURING OPERATION AS A PREVENTIVE OF SURGICAL SHOCK.

BROWN in the *British Medical Journal* of April 21, 1917, says that whatever theory of the causation of shock is accepted, it is quite certain that loss of blood and insufficient feeding are of great importance as predisposing agents. Operations on the stomach, such as gastroenterostomy and partial gastrectomy, are often accompanied by severe, and sometimes fatal, shock.

The operation is usually performed either for stricture of the pylorus and consequent gastric dilatation resulting from cicatrization of an ulcer in the pyloric region, or for malignant disease; in another class of case it is performed for severe hemorrhage from a gastric or duodenal ulcer. In the first class the patient's nutrition is low. Owing to the difficulty in the passage of food through the pylorus and the vomiting of a large part of the food ingested, a condition of starvation is induced, and when malignant disease is present, hemorrhages and cachexia add to the debility. In the second class the patient is usually profoundly anemic, and may have undergone a preliminary course of starvation only very partially alleviated by rectal feeding. It is not surprising that in such cases operations on the stomach produce an extreme degree of shock.

To combat this, it has been Brown's practice during the past ten years to feed the patient during the operation. The operation is proceeded with in the usual way until the suturing with catgut of the mucous membrane and muscular wall of the stomach

and jejunum is nearly completed—that is, to within the last one-fourth of it. A soft catheter with rubber tube and funnel attached is then introduced into the jejunum and passed on until the end of the catheter is in a coil of intestine well within the abdomen, the opening through which it is passed being held firmly with the finger and thumb to prevent any leakage of fluid. The intestinal and stomach clamps have been removed. A pint of peptonized milk, to which a beaten-up egg and an ounce of brandy have been added, is poured slowly through the funnel into the intestine; the funnel is held at a distance of 8 to 10 inches above the abdomen so that no undue distention of the intestine can take place. The catheter is then withdrawn and the operation completed in the usual manner.

Since adopting this procedure Brown has never seen serious shock follow an operation of this character, and the patient usually leaves the table with a better pulse than he had at the commencement of the operation.

A few weeks ago he operated upon a man of fifty-seven who was wasted and anemic. He had malignant disease involving the circumference of the stomach about five inches from the pylorus. Brown removed about two-thirds of the stomach, uniting the cardiac end to the jejunum. The operation was long, lasting for two hours, or a little more.

The blood-pressure, which was 140 mm. before the operation, fell to 90 mm. soon after its commencement, and was below 90 mm. when feeding was commenced. It had risen to 120 mm. half an hour later, when the operation was completed. He had no symptoms of shock afterward, and made an uninterrupted recovery.

Shortly afterward Brown operated upon a similar case, in which the carcinoma involved a still larger area of the stomach, and the resection was very extensive. The patient suffered somewhat severely from shock at the time of operation, but was sitting up in bed taking food well in the course of a few days. After an operation Brown generally starts regular feeding

within twelve hours, giving two ounces of peptonized milk hourly to commence with.

In performing gastrostomy for stricture of the esophagus of the cardiac end of the stomach upon a patient who is in a cachectic and semistarved condition, Brown always feeds during the operation, passing a catheter through the gastrostomy opening into the duodenum, and injects a pint of prepared food and continues feeding regularly at four-hourly intervals after the operation.

In addition to its value in preventing the development of shock, this procedure tends to promote the healing of the stomach and abdominal wounds. It is obvious that the cells cannot divide and repair take place unless the cells are provided with food. A speedy union is of great importance in the success of these operations.

DEATH DUE TO STATUS LYMPHATICUS FOLLOWING AN INJECTION OF DIPHTHERIA ANTITOXIN.

In the *California State Medical Journal* for May, 1917, HASSLER reports a case of this character. Because of its importance and rarity the autopsy results are of interest. The enlargement of the lymph glands throughout the body was general, together with a persistent and markedly enlarged thymus gland.

The cause of the sudden death is attributed to the condition of status lymphaticus in this boy, one among thousands, and who could not stand antitoxin.

It is interesting to note that on the previous day the sister of this boy, who was an active case, had received intravenously 20,000 units of the same antitoxin, and the following day in the same manner an additional dose of 10,000 units, and made a complete recovery.

This unfortunate case has not detracted from the department's use of antitoxin, either as a curative or prophylactic measure, but has brought its lesson, which may be of value to other health departments, namely, the prevention of death in such cases by the avoidance of criticism.

The Board of Health now requires:

First, the written consent of parent or guardian to administer antitoxin.

Second, the Sanitary Inspector must remain with the patient, or the contact, not less than one hour after its administration.

LIQUOR OF MAGNESIUM HYPOCHLORITE.

STEWART (*New York Medical Journal*, April 7, 1917) states that this solution may be made extemporaneously by adding a heaping teaspoonful of good calx chlorinata to a half-tumblerful of vinegar, and by adding two heaping teaspoonfuls of Epsom salts to a half-tumblerful of water. The two solutions should stand for fifteen minutes, then should be mixed, shaken, and filtered through gauze. A six-per-cent acetic acid will answer quite as well as vinegar; the different strengths of the domestic variety of the latter seem to be stumbling-blocks to exact scientific minds. It need not be so, as the vinegar is merely a solvent or a means of getting the almost insoluble chlorinated lime into a solution, therefore whether its acetic acid strength be four per cent or ten per cent is a matter of no moment. An eighty-per-cent acid is the best to use when bulk and portability are in question. The terminal result should be not less than two per cent nor more than six per cent after the solutions are mixed; anything more accurate is a refinement not obtainable in an emergency nor essential for any practical reason.

Stewart states that the relief of pain which follows the use of the solution is as incomprehensible as is the improvement of anemia through the administration of Blaud's pills. A long contact with any aqueous solution produces waterlogging on maceration. A similar contact with an alcoholic tincture results in hardening or a species of tanning; but this solution, called Mayer's solution, used in connection with a solution of sublimine in liquid paraffin Stewart has found to give almost ideal results.

The latter solution is made by adding

sublimine to liquid paraffin, in the proportion of 1:3000, or a saturated solution, which is about 1:500, may be employed. The method advocated is for the medical attendant to cleanse the wound thoroughly with the acid magnesium solution. A gauze dressing is applied, and the patient is directed to moisten this with the oily solution every two hours while he is awake, using fifteen to twenty minims each time and applying it by means of a medicine dropper. The dressing is to be changed but once in four to eight days. There is entire freedom from adherent dressings and from torn-off scabs.

The liquor magnesiæ chlorinatæ may also be used as a constant drip, and as a means of sterilizing the vagina. It is said that the vagina remains sterile for an hour and a half after the solution has been applied, best by simply pouring it into the introitus held open without the introduction of fingers or instruments.

We have not had the opportunity of observing the action of these solutions personally. Should the experience of others confirm Stewart's findings the solutions are of extreme value.

A SANE AND RATIONAL METHOD IN THE TREATMENT OF ACUTE GONORRHEA.

Under this alluring title MILLSTONE (*New York Medical Journal*, March 10, 1917) expresses himself as having been astounded by the results following a treatment which consisted in injecting 2 drachms of a 50-per-cent solution of peroxide of hydrogen by means of what the author calls a soft-rubber ear and ulcer dropper, this being retained for five minutes. The action of the peroxide was to balloon out the channel and open up the crypts and lacunæ of the anterior urethra. After this pleasing distention the patient was directed to pass the remainder of the urine, the first part having been passed before the injection. Thereafter two drachms of a very warm solution of boric acid were introduced, retained. for five minutes, and ex-

pelled. The shaft of the penis was next milked to expel as much of the boric acid solution as possible. Thereafter two drachms of the yellow oxide of mercury ointment were introduced slowly in such wise as to get the ointment into all the crypts and lacunæ. Thereafter the penis was allowed to hang dependent in a clean gonorrheal bag. The patient was then sent away and directed to take one teaspoonful of sodium bicarbonate three times a day. For the purpose of preventing erection a neatly fitting ring was slipped over the flaccid penis, causing such anguish on erection that the latter is inhibited. The author speaks in moving terms of the comfort afforded the patient by wearing this ring.

The injection treatment is repeated once daily for ten days. In three days the acute symptoms disappear, and in five days all discharges vanish. Fifteen days represents the longest treatment employed, nor could he find even a single gonococcus on what he called an "ejaculated specimen."

The special advantages claimed by the author for his method are that it prevents pushing the pus into the posterior urethra; that it is inexpensive, simple, clean; prevents the doctor's prescription from getting around the neighborhood; settles the question of stricture; and is soothing and non-irritating. He states, and who should know better, that it is the most scientific and logical method in the treatment of acute gonorrhea, and more nearly approaches a specific than any other. It probably requires an enthusiastic belief in its efficacy to produce its full therapeutic effect.

In contradistinction to these views there follows an article in this journal by GREENBERG, who holds that the object of treatment in acute gonorrheal infection must be directed not toward the suppression of the discharge, but toward its promotion, best accomplished by omitting treatment at the beginning of the disease. He resents, however, the pusillanimous abandonment of the case to Nature, of whom he speaks somewhat slightly as being given to whims and fancies. He would destroy the organ-

isms as they reach the surface of the urethra by the injection of silver salts, which, if they be nucleinate or proteinate, act as sedatives or bactericides in the early stage. In the chronic cases the electrochemically prepared iodine suspension of the same strength as the tincture of iodine has been of priceless service, alternated with silver nitrate irrigations and instillations. Iodine is recommended in all cases of chronic anterior urethritis which do not respond to the usual methods of treatment. Special caution is given to apply it directly to the diseased surface. Just how this is accomplished in the case of a chronic vesiculitis the author leaves to the imagination, or perhaps to the invention of the Futurists.

PHYSIOLOGICAL STUDY BEARING ON THE DISEASES OF THE BILE-DUCTS AND GALL-BLADDER.

MELTZER (*American Journal of the Medical Sciences*, April, 1917) regards the gall-bladder as an ingenious but simple mechanical device, by means of which a continuous glandular secretion is transformed into a discontinuous elimination. While the secretion of the bile into the biliary capillaries is a continuous process, the discharge of the bile through the common duct into the duodenum occurs only periodically. During the intervals between the periods of evacuation the bile is stored away in the then practically quiescent gall-bladder. It is an established fact that the bile salts as well as pigment are reabsorbed from the intestines, to be stored up again in the gall-bladder. It is quite probable that the presence of bile in the intestines, at a time when it is not needed for a specific digestive action, is liable to exert some injurious influence. Its periodical storage, therefore, in the gall-bladder presents a protective functional advantage. Furthermore, the bile in the gall-bladder is a great deal more concentrated than that which is present in the system of biliary ducts. Hence when the intestinal digestion is in that stage which requires the activity of the bile the intestine receives it by the aid of the gall-bladder at once in a

concentrated form. From its very function there is a tendency toward sepsis in the gall-bladder. Moreover, bile even under normal conditions seems to contain all the living pathogenic organisms. Even in health it may be so. In typhoid the blood harbors typhoid bacilli during the entire course of the disease. None the less, even in typhoid, cholangitis and cholecystitis are comparatively infrequent; this because the mucosa maintains its normal vitality and does not offer a favorable medium in which the microorganisms can settle and grow. Moreover, the other safeguarding factor is the absence of an abnormally prolonged stasis of the bile in the various parts of the biliary system. Bile stasis is of primary importance as a pathogenic factor in biliary diseases. Stasis alone, even without the intermediary action of inflammatory processes, favors the development of biliary calculi.

Hence it is obvious that the physiological quiescence of the gall-bladder harbors a pathogenic element. May not conditions happen which are capable of converting the periodically occurring physiological quiescence of the gall-bladder into an abnormally prolonged quiescence, thus converting the physiological storage of the bile into a pathological stasis? The law of contrary innervation is manifest in all functions of the animal body, and the author believes that a disturbance of this law is a factor of more or less importance in the pathogenesis of many disorders and diseases of the animal body. On general principles the impulses inhibiting the action of antagonists must be an integral part of any kind of movement in the animal body. For instance, simultaneously with each contraction of the extensors an inhibition of any form of contraction of the flexors, and *vice versa*, must take place; otherwise normal locomotion would be practically impossible. This principle is an integral part of the respiratory mechanism, as it is of deglutition. Intestinal gastric colic is due to a disturbance of this law of contrary innervation, the caudal end remaining contracted and stationary while the cephalic end con-

tracts and progresses forward. The gall-bladder is well provided with muscle fibers, the contraction of which will free the gall-bladder from its fluid contents. As to the termination of the common duct, Oddi stated some thirty years ago that the papilla of Vater is provided with circular muscle fibers which by their contraction close up the common duct. This contraction is strong enough to resist a pressure much higher than that which usually obtains in the bile-ducts. It is clear that the muscle fibers of the gall-bladder and those of the papilla are antagonists.

Applying our knowledge of the mechanism of the urinary bladder, and more generally the law of contrary innervation, the physiological mechanism of bile storage and bile discharge is quite simple. During the storage the muscle fibers in the papilla are contracted and those of the gall-bladder are inhibited; during the discharge the gall-bladder contracts and Oddi's muscle is relaxed; the bile has then no other way out but into the duodenum. The innervation of the concerned parts, although not yet settled in its details, is very interesting. According to Doyon, stimulation of the peripheral end of the splanchnic nerve causes simultaneously a contraction of the gall-bladder and an inhibition of the tonus of Oddi's muscle. The vagus, on the other hand, seems to contain motor fibers for the sphincter of the common duct and inhibitory nerve fibers for the gall-bladder. Furthermore, also the afferent innervations show the character of contrary innervation. For instance, stimulation of the central end of the vagus causes simultaneously a contraction of the gall-bladder and an inhibition of the sphincter muscle.

While the physiological muscular and nervous mechanism of bile storage and bile discharge is thus satisfactorily explained the question presents itself: What are the causes which bring about either of the two actions? Bruno stated that no bile appears in the duodenum as long as the stomach is empty. When a meal is taken the entrance of chyme into the duodenum gives the signal for an ejection of bile from the common

duct. Most interesting are the recent studies of Rost. He first established the fact that after cholecystotomy the escape of bile through the papilla of Vater is indeed continuous, while in normal animals it is always discontinuous, depending upon the entrance of food into the duodenum. He found, further, the instructive fact that injection of peptone or albumose through a duodenal fistula in a normal dog causes immediately a discharge of bile from the common duct, and he has proved that this takes place by a reflex act which causes a contraction of the gall-bladder and simultaneously a relaxation of the sphincter of the common duct.

From the foregoing it seems quite safely established that the physiological discontinuous character of the flow of bile into the duodenum is regulated by a reflex mechanism, dominated by the law of contrary innervation; that the integrity of the gall-bladder is an important part in this reflex mechanism; that the discharge of bile can be greatly curtailed by the absence or a restriction of the discharge of chyme from the stomach into the duodenum, and that the discharge of bile through the papilla of Vater into the duodenum is greatly enhanced by the presence in the lumen of the latter of peptone or albumose.

There are the influences of the partaking of food and of the character of the food which is partaken of which may prove sooner or later to be pathogenic factors in the formation of biliary diseases. Continuous fasting for many days, or even weeks, may be of less significance, since the consecutive stasis may be corrected by a gradual absorption of the stagnant bile and a great reduction or complete cessation of secretion of new bile. But simple infrequent feedings, say the partaking of only one meal or even two meals a day, may very gradually finally lead to pathological consequences. The accumulation of the bile in the gall-bladder and in the ducts for longer periods, and the continued repetition of these periods, may gradually reduce the normal resisting power of the corresponding mucous membranes which may become a

serious pathogenic factor, in case the biliary fluid has passed or is passing through the common duct into the duodenum, and thus into the infectious disease. Furthermore, from the above-mentioned experiments of Rost, in consideration, the abstaining from the partaking of proteins or partaking of them infrequently or in minimum quantities may prove to be another factor in the pathogenesis of biliary diseases.

From these considerations it follows that even in health it is advisable to partake of comparatively frequent meals, although the meals need not consist of large quantities, and that the meal shall contain foods which readily send peptone and albumose into the duodenum. This principle ought to be especially observed in infectious diseases of the biliary system in which the bile contains the causative organisms. In typhoid, for instance, food should be administered every two hours, and the food should contain materials which readily be converted into peptone and albumose.

IMPORTANT PRINCIPLES IN DRAINAGE AND TREATMENT OF WOUNDS.

PEARSON (*Lancet*, March 24, 1900) records his belief that antiseptics commonly used in wounds are valueless and that the secret of success lies in free drainage. He does not go so far as to assert that antiseptics are hurtful. What is sufficient for free drainage in the common infections of surgical practice is usually totally inadequate in dealing with a wound infection of serious magnitude. It is impossible to overstate the freer the incision the quicker and more satisfactorily the wound heals. From the operative point of view drainage is not a mechanical problem. The chief factors governing the efficacy of drainage are (1) Absence or reduction of resistance to outflow; (2) gravity; (3) capillary action. The first two of these are closely connected.

The freer the exit the less is the resistance offered to the escape of discharges from the wound. This shows the necessity for deep incisions in dealing with infection, particularly in deep wounds. Our aim should be to convert these into cone-shaped openings.

the base of the cone being situated at the surface, so that free exit is obtained from all parts of the wound; pockets and tracks should be thoroughly opened up; "tunnels" should usually be laid open throughout unless anatomical considerations forbid; obstructions within the wound should be removed, so that good access and free exit are established throughout. The necessity for extensive surface openings is very much greater in the case of infections in projectile wounds than in those of civil practice, so that it is evident that there is something more than the mere question of free exit involved. The explanation is to be found in the nature of the infecting organisms, which usually contain large numbers of anaerobes in the former.

Free drainage in the wound itself will not avail if the outflow is obstructed externally, and therefore attention should always be paid to this matter. Dressings should not be applied tightly, splint pressure must be carefully avoided, and the patient must be disposed in bed in such a way that no pressure is exerted over the wound. These are points which are frequently neglected, and it is difficult in the course of a paper to frame rules for every case. Briefly, however, he points out that wounds in the posterior surfaces of thigh or leg should be treated by slinging the limb from a Balkan splint or leg cradle; in back and buttock wounds the patient should be placed on a "spinal bed" or framework with removable canvas "slats," so that pressure against the wound may be avoided—failing such an apparatus the patient should be kept in the lateral rather than in the dorsal position; wounds of the upper limb may often be conveniently treated by suspension in a Thomas knee-splint or from one of the more elaborate devices.

The value of gravity and the use of counter-openings as an aid to drainage are not sufficiently appreciated in practice. This is particularly so in cases of wounds on the front of the thigh with, perhaps, a compound fracture of the femur. In these it is not uncommon to find, even after weeks of treatment, that the only exit is an overflow,

that the whole wound is a foul cesspool of pus which has tracked extensively in the limb, and that there is wide-spread necrosis of the bone and complete absence of union in the fracture. Such a condition can easily be avoided if in the first instance, no matter how free the anterior opening may be, a good counter-opening is made into the deepest part of the wound—preferably, in thigh cases, from the posteroexternal aspect of the limb.

In extensive wounds with much laceration of tissue it will frequently be necessary to make several counter-openings to deal with different recesses or "pockets," but the surgeon should have a definite purpose in view for each opening he makes; it must never be made by "rule of thumb," but to suit the exigencies of the particular case. The efficient drainage of each individual wound is a problem in itself which should be governed by definite principles indeed, but the details of which depend on the exact characters of the wound. Often it is a simple matter and can be determined at a mere glance; at other times it becomes one of great complexity and cannot be solved without thorough digital exploration and inspection of the wound on the operating table. Even then anatomical considerations may prevent one from following the most efficient mechanical plan, and one has to adopt something less. But what the author wishes to emphasize is that no other measures which we may employ will adequately replace a mechanically perfect system of drainage.

Capillary action, though of less importance than free exit and gravity, is also a valuable mechanical aid in promoting drainage; it literally "draws" the discharge. In employing gauze wicks and packs for this purpose it is important to observe the following points:

The gauze should extend into the various parts of the wound, which should be filled up evenly and with but moderate pressure throughout; it should constitute what the author terms a "fluff," and not a tight pack.

Dead spaces should not be left within the gauze or between the gauze and the walls of

the wound, as they will favor stagnation and decomposition of the discharge and form an excellent culture-ground for bacteria.

In order to maintain capillary action it is necessary to prevent water-logging of the gauze drain. Hence we should allow evaporation to take place and should never employ a water-proof covering over the dressing during the period of profuse discharge. For this reason, too, external dressings of gauze will be much better than close substances such as lint. The time-honored boric fomentation is strongly condemned at this stage, as it rapidly becomes merely a pus poultice, but unfortunately its use is still common. Copious coverings of wool and the application of firm, heavy bandages should similarly be avoided except for the purposes of transit. The use of large quantities of wool for the purpose of soaking discharge should also be condemned on grounds of economy, as much of the wool now in use is anything but absorbent, and discharges merely track along inside the dressing to find their escape in the bed-clothes. If the external gauze dressings become saturated they should be changed immediately.

It is in the acute virulent stage of infection, when the discharge is usually profuse and serous in character, that capillary action is an effective aid to drainage; it is of no value when discharge is thick and purulent. If gauze packs are used then, and if discharge is profuse, they become clogged with secretion in a short time, and acting as foreign bodies merely delay the cleansing of the wound.

If a wound is thoroughly cleansed of foreign material and dead tissue and efficiently drained on the lines indicated, the change in character of the discharge from thin serous to thick purulent is accompanied by such a diminution in amount that there is no stage in which we find a profuse purulent secretion. The occurrence, and particularly the persistence of the latter, should always lead one to suspect either a foreign body, dead tissue (especially bone), or defective drainage. Indeed, many flesh

wounds treated on these lines clear rapidly within a week, so that it is difficult to say that there has been any purulent stage, and they may readily be closed by secondary suture or strapping with adhesive plaster.

A drainage-tube should be employed where a dead space cannot be avoided by gauze packing, or where dead tissue is present whose complete removal is inadvisable during the early stage of infection (*e.g.*, most compound fractures), so that a prolonged period of free discharge is anticipated. The tube should lead down to the lowest point, and it may often lie conveniently in the midst of the gauze packing, so that it does not come into contact with the walls of the wound. It must, however, act in the direction of gravity, if possible—through a counter-opening, if necessary. Through the tube a gauze wick may be introduced with advantage while the discharge is serous in character. Occasionally it is useful to keep both tubes and wick long, so that the wick may project for some distance from the wound and in this way exert an increased siphonage or suction action on the discharge and convey it to a convenient receptacle.

In deep wounds where neither dead space nor necrotic tissue exists, but where the escape of discharge is in an upward direction, a tube should be led through a dependent counter-opening into the deepest part of the wound or the wound may be enlarged in such a manner that gravity no longer hinders but favors drainage. Where neither measure is feasible a tube should be led directly through the wound to its deepest part, and through it discharge should be aspirated as it accumulates.

The advantages of loose dressings and their exposure to the air to prevent stagnation and stagnation of discharge and to favor drainage by capillary action have been mentioned already; but exposure of the wound itself is sometimes of special value.

In the early stages of severe infection when first a wound has been opened up the author has sometimes found it advantageous merely to cover the wound with one or two thin layers of gauze, which are laid ev-

in contact with the surface all over, and to use a bed of dressings on to which the discharge runs. This is best suited to widely gaping or open wounds such as the raw ends of septic "chopped-off" amputation stumps, and he knows of no method by which they clean up and become covered with healthy granulations more quickly. Presumably, in addition to the continuous and thorough removal of all discharges, this method has the advantage of combating anaerobic infection very effectively.

Two of the most important complications which one meets in dealing with wounds are muscles which are the seat of inflammation which are liable to become permanently shortened, and so to lead to crippling deformities, especially in the limbs. Such deformities are usually easy to prevent but difficult to cure. Consequently we should guard against them from the start, and maintain the limb in suitable position. Contraction of the hamstrings with permanent flexion of the knees, and of the calf muscles with drop-foot, are amongst the most important; corresponding conditions may occur in the upper limb. If injury to muscles is likely to impair or destroy the mobility of a neighboring joint, the joint must be kept in the position in which it will be of the greatest use subsequently.

Secondary hemorrhage is almost invariably an indication that the drainage of a wound is faulty. Consequently it should not occur subsequently to operative treatment for infection, and it will practically disappear if adequate mechanical drainage is effected in the early stages. When it has occurred the case must be submitted to operation without delay, otherwise recurrence is a practical certainty. In every case in which it is anatomically possible the wound should be explored and the source of bleeding found and dealt with directly by division of the vessel on both sides of the lesion, choosing a healthy part of the vessel wall.

In conclusion the writer believes that efficient mechanical drainage is the essential factor in the successful treatment of infection.

The cardinal principles governing drainage are: Freedom of exit; gravity; capillary action.

Drainage-tubes should not be employed unnecessarily. They should effect the purposes for which they are used, and should not act injuriously in the wound.

Dressings should not be tight, of close texture, or waterproof. They should be exposed to the air while discharge is profuse.

Continuous irrigation aids disinfection by mechanical removal of discharge. It is usually not feasible when dealing with large numbers of cases. It is not necessary in order to obtain good results.

Free administration of fluids to the patient is an important adjunct in the treatment of sepsis.

The value of concentrated saline solutions and antiseptics as aids to disinfection is doubtful and negligible.

The use of salines and antiseptics in no way diminishes the necessity for free mechanical drainage.

Vaccines are not helpful in dealing with infections in wounds of war.

Rest is an important factor in wound treatment and should never be neglected.

Most of the complications and sequelæ of infection are due primarily to inefficient mechanical drainage, and are therefore preventable.

Delay in healing is almost invariably due to local mechanical causes.

THE LIMITS OF BLEEDING CONSIDERED FROM THE CLINICAL STANDPOINT.

BERNHEIM (*American Journal of the Medical Sciences*, April, 1917) holds that a rapidly falling blood-pressure is always a warning of value, although it must be remembered that nausea of the slightest degree will send the pressure down. Pallor, the clammy, sweaty skin, the anxious countenance, are all danger-signals that occur to one at once, and air-hunger when present is always of true diagnostic import.

In cases of severe hemorrhage—it matters—

not what the cause—a good working rule is to transfuse if the blood-pressure falls as low as 70 mm. of mercury, since life is hardly possible with anything below this level. But even in these cases the rule must be somewhat elastic, because one can never tell when the pressure is going to rise. In some instances if the physician or surgeon in charge of the case has not taken the steps usual in emergency cases, such as salt infusions, etc., it may be wise to delay until these can be instituted, preparations for transfusion being made in the interval. If no appreciable results occur within one hour the case is usually hopeless unless new blood is introduced, and procrastination at this stage of the game is a fearfully dangerous plan.

Curiously enough, the blood picture itself is of little avail in severe accidental hemorrhage. Even in cases of actual air-hunger, blood counts alone do not indicate the dire need for fresh blood. In fact, so constantly has this state of affairs been found in cases of this sort that this feature is now entirely ignored. The explanation of this seeming paradox is that a sudden, terrific loss of blood apparently gives rise to a tightening up at first of the vascular apparatus, a narrowing of the vessel lumen, thus causing a concentration of the blood remaining in the peripheral system and at the same time preserving a blood-pressure sufficient to sustain life. The true anemia does not become apparent until later on, when the vessels have relaxed and taken up a renewed supply of plasma with the resultant blood dilution. It is, therefore, not infrequently an extremely difficult matter to determine the actual limits of bleeding. Cases must be judged in the aggregate, after a careful consideration of all features, and even then a positive answer is not always forthcoming.

Before dismissing the subject of accidental blood loss, a few words might be in order concerning the use and abuse of drugs and salt solution in the treatment of these conditions. Drugs are of little aid in acute bleeding, morphine, judiciously given, excepted. Digitalis and strophanthin may

possibly momentarily support a failing heart, but it is not the heart that is at fault. A quarter of a grain of morphine seems to be indicated at the start of any hemorrhage to quiet any restlessness; after that the doses had better be smaller, because of the depressant effect of this drug on respiration and blood-pressure. Measures to stop the bleeding should be instituted immediately, and the body should be kept as warm as possible, the foot of the bed elevated, the limbs bandaged, the patient kept quiet, water given *ad libitum*. The custom of giving salt solution (or water) per rectum after an operation of any magnitude is a good one, and the salt infusion in cases of bleeding is also good, as is at times intravenous salt—all within reason. But it is ridiculous in the extreme to keep filling a patient full of salt solution just because a great quantity of blood has been lost. Salt solution will not turn into blood—yet it is all but expected to do so.

It never seems to occur to some men that a heart can be overdistended, that the blood can be made too dilute, that if 1000 Cc. or 1500 Cc. of salt do no good, a greater amount will be equally valueless. But again and time again has the author seen infusions repeated after 2000 Cc. of salt have been given without any benefit at all. Every one knows it is proper to give salt solution in cases of blood loss, but very few stop to consider how much ought to be given.

It should be generally understood that if the bleeding has not been too great a hundred cubic centimeters of salt are all that is needed to tide a patient over. In cases of very severe hemorrhage the amount might be increased a bit, but if 1200 Cc. do not steady a falling blood-pressure or if after a slight rise its introduction had better be discontinued. Even when there has been a rise the greatest caution must be exercised, for be it remembered that in these desperate conditions salt will frequently cause a rise in blood-pressure, but will not sustain it. When the bleeding has been excessive transfusion is indicated, because it has been conclusively shown that blood alone cannot raise a pressure and sustain it. Salt

has no sustaining power *per se*, and when the fall comes after a rise from this it usually portends the end, for added solution is useless. It never raises a pressure twice!

It should be understood that in cases of chronic bleeding the coagulation apparatus tends to become deranged, and the longer seepage continues the less liable is spontaneous cessation to occur. And the curious feature is that in many of the worst of these cases the coagulation time of the blood outside the body is but little delayed.

The chronic anemias are, from the author's view-point, permitted to progress entirely too far. A continuously falling hemoglobin under this therapy is a danger-signal, and when the hemoglobin reaches, say, 30 per cent, why not introduce new blood and give the drugs a bit more to work on?

The same thing may be said of the definite undiagnosed anemias some of which are permanently cured by transfusion; and the intestinal bleedings from ulcers, duodenal and gastric, may be placed in the same category. The convalescence of many of these patients could be materially shortened by the introduction of whole blood. Why compel them to start from the depths and rebuild entirely when it is known to be so difficult and tedious, and, by repeated demands, the blood-forming organs have been strained to the breaking point?

Bernheim urges that henceforth transfusion be not regarded entirely as a measure of last resort—food for the reporters of spectacular stories of the dead brought to life. A more thoughtful attitude concerning blood loss from any cause is greatly to be desired, and the phenomena accompanying bleedings of all magnitudes should be carefully noted and studied, with the view to improving the general knowledge of such matters. Furthermore, a partial revision of the existing ideas of combating hemorrhage and the condition commonly known as shock may possibly be of material advantage in view of the fact that transfusion may be done so readily at the

present time. But above all, surgeons and physicians should learn to recognize the limits of bleeding and to act promptly. In the acute hemorrhages, according to his experience, the safest guide is the blood-pressure; in the chronic bleedings and the anemias it is the hemoglobin; but one must never lose sight of the fact that at times all signs fail, and there remains naught for guidance but experience and judgment. Under these circumstances the author's advice is, "When in doubt, transfuse!"

METHODS AND RESULTS IN SURGERY OF THE STOMACH AND INTESTINES.

CRILE (*West Virginia Medical Journal*, April, 1917), referring to acidosis, points out the danger of pink lips and hurried respiration in patients with diseases of the stomach and intestines. The respirations are increased, the temperature low, the brain power diminished, the lips bright-red. Life is projected in an alkaline medium; and life ends when alkalinity is overcome. When the body fluids become neutralized or acid death automatically follows. Every process of life is accompanied by the formation of acid by-products. Under normal conditions these constantly formed acid by-products are neutralized and the normal alkalinity of the body is maintained by the alkalies and bases normally stored in the body, and by the regulative action of the respiratory system, the liver, and the kidneys.

Since the main source of the vast potential alkalinity of the body must be the alkalies and bases derived from the food, when a patient is starved by vomiting his reserve alkalinity steadily falls. As a result the relatively slight acid production resulting from his diminished activities cannot be neutralized, and consequently the reserve alkalinity of the body is diminished.

As the acidity rises the respiratory rate is increased in order that the carbonic acid gas may be eliminated. Acidity interferes with the use of oxygen, and the power of the body to use oxygen decreases simultane-

ously with the increased intake of oxygen consequent upon the increased respiration; hence the pink lips and reddened mucous membranes—signs of the increased amount of free oxygen in the blood. This condition is known as pink asphyxia. The intense thirst manifested by these patients is an acid phenomenon, water being necessary to acid elimination. Another obvious sign of vanishing alkalinity is the mounting temperature. This last sign indicates the last critical stage before death and shows that the available stores of alkalis and bases have been exhausted and that the acids are therefore combining with the ammonia of the living protein molecules, the destruction of which produces the fever.

For the starved cases with strikingly red lips and dry tongue, and above all with a rising temperature, resurrection, not operation, is indicated.

Food, water, glucose, and sodium bicarbonate should be pushed. Those which are nearing their ultimate acidity may be rescued by bringing up a loop of the jejunum under local anesthesia and feeding through it.

Surgical trauma diminishes reserve alkalinity. In all but unquestionably good risks, therefore, in which the diagnosis is clear, a two-stage operation is indicated; first, a gastrojejunostomy, resection being deferred until the functional balance is restored and the basic factor of safety is increased—usually in about ten days.

Nitrous oxide is preferred to ether. The patient is treated as if acidosis were expected. Saline infusion is given subcutaneously; sodium bicarbonate and glucose are given by the Murphy drip. Sleep is induced by every possible means, since the lesions caused by acidosis can be repaired only during sleep. Morphine is contraindicated in cases in which acidosis is present or threatened, since morphine, while it prevents the further production of acids, also inhibits the neutralizing power of the body fluids to their normal alkalinity. Bromides per rectum are therefore substituted for morphine in these cases.

As to the resection of the stomach, this

is done by the thermocautery, Peyer clamps, and the margins of sion are sterilized by the cautery. vent leakage the divided ends are and closed with the shoemaker stitch as a further protection a series of ruptured silk sutures reinforce the sh stitch, which is of chromic gut.

In case of ulcer the operation is end, but rather only a part of the ment. To be definitely cured the must continue for not less than six under the same routine treatment operation had been performed. Lo operative treatment is required to fundamental and permanent cure.

INTRACANALICULAR PAPILLOMA OF THE BREAST.

JUDD (*Journal-Lancet*, March 1909) calls attention to the circumstance that a characteristic feature of intracanalicular papilloma of the breast is a bloody discharge from the nipple, this being the only symptom, tumor not being palpable. Papillomas may be located at any point along the milk ducts. They have been reported as occurring between the ages of twenty and eighty-one, though they seem more common past middle life. Papillomatous growths arise from the walls of the milk duct. Tumors present will be found in the central part of the breast, usually directly under the nipple. The only difference between intracanalicular papilloma and intralobular cystadenoma would seem to be the place of origin. Bleeding is more a symptom of benign condition than of malignancy. Nor does Judd regard it as an indication for operation. He reports 12 cases which have been under observation for some time. They were treated, and with most of them the bloody charge ceased at the end of a few days. In one case on record the disease continued for twelve years. In one case reported by Lewis malignant changes were found. What was primarily an intracanalicular papilloma. This was the only case in which Judd could find in which these

ld be observed. The patient had bloody charge from the nipple for three months. imann reports two cases in his series ch from gross appearances he thought e malignant, but the pathologist reported y were benign. Greenough and Simmons series of 20 cystadenomas report three ignant cases.

udd has reviewed 100 consecutive cases discharging nipples—50 which had sero-hemorrhagic discharge and 50 which had charge of other forms. In the first up of 50 he found the following patho-c conditions associated with bleeding ole: 27 patients had carcinoma of the ast; 12 had chronic cystic mastitis; 8 intracanalicular papilloma. In three es the early discharge seemed to be a hemorrhagic oozing from the nipple, ch later proved to be the seat of Paget's case.

The second group of 50 cases included se in which there were various kinds of charges, exclusive of the hemorrhagic e. There were 30 carcinomas; 14 were ances of chronic cystic mastitis, and r were intracanalicular papillomas, with instances of simple cyst. A tumor was sent in 29 of the 30 cases of carcinoma; first symptom in 23 of the 29 was or. In the remaining seven cases there discharge from the nipple.

A tumor or palpable thickening in the ast was present in seven of the 12 cases chronic cystic mastitis. In nine of the the first symptom was discharge. A palpable tumor was present in four of the nt cases of intracanalicular papilloma. reviewing the 32 cases of papilloma of breast he found 8 were intracystic papil-las; 8 intracystic carcinomatous papil-las; 10 intracanalicular papillomas; 3 carcinomatous intracanalicular papillomas; intra-acinar papilloma; 2 intracanalicular illomas associated with carcinoma of breast. In this series carcinoma was sent in 11. In three other cases the hologist believed the disease was car-omatous, but he was unable to make a nite diagnosis. The characteristic fea-e of these 32 cases was bleeding or a

serohemorrhagic discharge from the nipple. In no instance was there a papilloma in the duct large enough to be palpated, except in one case, in which it extruded from the nipple; in each case where a mass was felt it was due to chronic mastitis.

This review of 100 cases of discharging nipples would seem to confirm former reports on the subject. Carcinoma appears to be the most common lesion producing a discharge from the nipple, but it is almost invariably associated with a tumor in the breast. Tumor is usually present, some-times before the discharge begins. In some of Judd's cases of chronic cystic mastitis, the discharge may have been from a duct papilloma, for often these tumors are very small and might easily be overlooked. This series also seems to lend evidence to the contention that a hemorrhagic or sero-hemorrhagic discharge from the nipple in the absence of a palpable tumor is most often produced by benign intracanalicular papillomas. In view of this fact, treatment should be conservative, especially in young women. In older women, particularly if the condition is associated with chronic cystic mastitis, the best procedure would seem to be the removal of the mammary gland. If there are evidences of malignant change, a radical operation should be done.

METHOD OF OBTAINING BLOOD FROM INFANTS AND YOUNG CHILDREN.

KASTNER (*Wisconsin Medical Journal*, April, 1917) thus describes the procedure of obtaining blood from young children for the Wassermann or other tests. He states that in order to obtain sufficient blood from finger, toe, or ear, incisions are sometimes necessary that border on mutilation, and the end results oftentimes reveal as much blood outside the container as within. It is notorious that in the very young, for one reason or another, it is often very difficult and often impossible to needle successfully the various surface veins. In the infant with an open anterior fontanel the longi-tudinal sinus certainly offers an ideal site for an abundant and uncontaminated supply

of blood. Still, on account of a demand for skill and experience in a rather unusual direction, the longitudinal sinus is not apt to be a popular route of choice. Though a safe and certain procedure in skilled hands, puncturing the frontal sinus is apt to be considered a measure somewhat heroic when 1 or 2 Cc. of blood is the only desideratum.

As every method known has advantages and disadvantages, the choice of a method is after all only a question of expediency. That is the writer's chief reason and excuse for bringing to notice another method which, though also open to objections, he has found to be quite satisfactory and very practical.

The patient is wrapped in a sheet, arms down the side, just as if preparing for an intubation. Infants are held in the arms of an assistant, older children may sit on lap or table. The nostrils are cleansed with a mild antiseptic solution and a cotton applicator. Remembering that the common seat of epistaxis is from the lower and anterior portion of the cartilaginous nasal septum, where the mucous membrane is particularly thin and vascular, a short horizontal incision is here made with a small, sharp, cotton-guarded knife. The incision in the septal mucous membrane is best placed a trifle above the floor of the nasal passage and well in the nostril, selecting a site that is easily accessible, open to inspection, and convenient for subsequent tamponade. As soon as the cut is made, almost invariably blood begins to flow. The baby in arms is then bodily reversed and older children are bent sharply forward, so that in either case the tip of the nose is dependent and makes an admirable spout from which the blood drops or trickles into the test-tube or vial. When sufficient blood has been obtained the nostril is plugged with cotton. This method is most easily practiced in infants, but the writer has used it successfully and with little trouble in children of seven or eight years. The presence of a nasal discharge is apt to be troublesome and even a positive contraindication to nasal bleeding. A nasal discharge can be very effectively dealt with, however, by

thoroughly plugging both nostrils before incision is made.

The possibility of infection following incision must be considered. For the great vascularity of the septal membrane, which makes it such an excellent field for drawing blood, also is a source against infection. The author has had no nasal infection in any of his cases. The mucus drawn from the nostril is of course sterile, but he doubts if the contamination is very much greater than when blood is drawn from a finger or toe. At all times it is wise to have the specimen in the test-tube as soon as possible after it is obtained.

APPROVED NEWER METHOD OF TRACHEAL GENERAL ANESTHESIA.

COBURN (*Medical Record*, March 1900) holds that the insufflation method is particularly for the administration of ether is one of the newer methods that will survive. There are three important variations of this method, depending upon the termination of the tube that conducts the vapor to the patient, viz., the larynx, pharynx, and buccal cavity.

In tracheal insufflation, the patient is deeply anesthetized by the usual method. The head is then thrown back, and by a laryngoscope, or other similar method, the vocal cords are exposed; then a small catheter, about 22 to 24 F., is passed between them, and on into the trachea until the distal end reaches to about 1 inch above the bifurcation. The laryngoscope is next withdrawn, the proximal end of the catheter connected with the apparatus, and the insufflation begun. The inward stream of air passes through the catheter while the outward flow passes between the walls of the trachea and the tube.

In tracheal insufflation practically all the respiratory effort is removed by forcing a large volume of air into the lower part of the trachea, and this undoubtedly is an important factor in the development of the amount of shock observed in this method of anesthesia. Obstruction to free respiratory movement, caused by the tongue and

gescent tissues of the throat, is more experimental than it is generally considered. It may be largely corrected in the inhalation methods by the use of a suitable breathing tube, but the benefit thus gained is not complete as that of tracheal insufflation. Outside of the catheter the flow of air in tracheal insufflation is continuously outward. This prevents the aspiration of food, and infectious and foreign material, and is another of the marked advantages of this method. Artificial respiration may be maintained by tracheal insufflation for hours, or even days, and constitutes the best means at our command for this purpose, when the catheter is inserted.

The amount of air insufflated into the trachea is about 270 gallons per hour, or practically double the usual respiratory requirement. This amount of air is sufficient to keep the lungs distended when the pleural cavity is open, and tracheal insufflation has, therefore, come to be quite extensively used in chest surgery.

In pharyngeal insufflation, after the patient is deeply anesthetized, the short catheter is inserted through the nares into the pharynx, and the insufflation begun. The amount of air insufflated need not always be so much as that required in the tracheal method, but the amount of ether vapor must be the same. The obstruction at the base of the tongue is automatically removed in the pharyngeal method also, but not so perfectly as in the tracheal method.

While tracheal insufflation has heretofore been extensively used in chest surgery, yet pharyngeal insufflation possesses special advantages for this very work. After the chest cavity is open, the distention of the lung is under more pliable control with pharyngeal insufflation, as such distention is continuous in the tracheal method, and the collapsed lung is always in the field of operation on account of this distention and thereby interferes with the work of the surgeon, whereas in the pharyngeal method the lung of the side under operation collapses, thereby facilitating the work of the surgeon. When the operation is completed the surgeon is ready to tie the last

sutures, the collapsed lung is easily and quickly expanded by placing a wet towel over the patient's face. This retards the outflow of air, and the insufflated air is of such large volume that it quickly distends the lung.

In insufflating into the buccal cavity the rubber tube is usually connected to a mouth-gag or curved metal tube. This method is more particularly adapted to the removal of tonsils and other short operations in the throat. In operations of this character, where the primary anesthesia is not of sufficient duration to last throughout the operation and a reapplication of the mask becomes necessary, the anesthesia should always be maintained by one of the insufflation methods so that the patient may not pass alternately from a deep to a light anesthesia. Passing alternately from a deep to a light anesthesia without rebreathing tends to produce sudden fatality, as shown by Henderson.

All of the insufflation methods possess advantages over the usual inhalation methods. The vapor is always warm as it is delivered to the patient. The rate of administration can be more evenly maintained, consequently the resulting anesthesia is smoother, and the patient is less liable to be overanesthetized. In tracheal and pharyngeal insufflation the obstruction at the base of the tongue is automatically eliminated, consequently the patient is not devitalized by forced breathing against respiratory obstruction. Most all of the electrically driven apparatus for insufflation now have a suction as well as a pressure appliance. The anesthetist and apparatus are away from the patient's head, and do not interfere with the surgeon, this feature alone rendering them the methods of choice in many operations within the throat and buccal cavity, and on and about the face and head.

It is quite certain that the chest cavity may be opened with impunity with either tracheal or pharyngeal insufflation; also with nitrous oxide when administered with the regular face mask, but under pressure, and with ether similarly administered.

The closed method with pure oxygen is another of the newer methods of administering ether that deserves permanent recognition. His attention was called to this method by Rice. He uses a Coburn breathing tube, through which he directs all of the respiratory current. To such tube he connects, by rather elaborate special fittings, a rubber bag into which he allows the oxygen to flow, after it is passed through ether. He uses about 16 gallons of oxygen per hour. He uses his regular apparatus for nitrous-oxide-oxygen-ether, and substitutes air for nitrous oxide. With this technique, only about 8 gallons of pure oxygen per hour is needed. As in all other inhalation methods, he uses the breathing tube to remove the obstruction at the base of the tongue. The oxygenation in this method is very good, and this undoubtedly contributes to its merits. Deficient oxygenation increases the toxication of all anesthetics.

Most of the objection raised against the administration of ether by the closed, or rebreathing, method is erroneously attributed to alleged harmfulness of carbon dioxide retention, when what is often meant is lack of proper oxygenation. It is only so long as the patient depends exclusively upon air for available oxygen that cyanosis and carbon dioxide retention go hand in hand, and the evil results of cyanosis have often wrongly been attributed to carbon dioxide retention, on account of this concomitant relation under the usual circumstances. When pure oxygen is added to the respiratory current, oxygenation and carbon dioxide retention vary independently of each other.

Carbon dioxide is a pronounced respiratory stimulant. Unless the patient is too deeply anesthetized, its excessive retention will be clearly indicated by the increased and deepened respiratory movements. This effect may be readily recognized, and is easily corrected by lessening the amount of rebreathing.

There are those who condemn rebreathing in ether administration, yet complacently use it with nitrous oxide. A greater inconsistency would be hard to find. At the

present time, practically all of nitrous oxide administration is with rebreathing, thoroughly establishing the harmlessness of the principle when under supervision. Scientists have accepted this view, and the whole theory and practice in ventilation has changed accordingly. But much more may be said of rebreathing than that it is harmless, although this is full answer to the adverse critics. It possesses positive advantages, and it is for these advantages its use is here advocated.

Muscular relaxation in the closed method with oxygen is ideal. This feature renders it the method of choice for administering ether in abdominal and thoracic surgery.

Nitrous-oxide-oxygen is another of the newer forms of anesthesia that is commanding advocates. There is no question but that straight ether, from the point of view of use, is the leading anesthetic at the present time. But ether has certain undesirable logical effects that greatly mar its desirableness. Its persisting and nauseating induction, its long and unpleasant induction, its long period of elimination, its irritating action upon the organs of elimination and the respiratory tract, its dissolving of the lipoids of the cells of the brain and other organs, its destructive action upon the red blood cells, its impairment of resistance against infection (as Crile tersely says, "ether attacks the phagocytes as well as the patient"), and its general toxic effect as evidenced by nausea, vomiting, and depression, render it far from the ideal anesthetic. Many persons who have had experience with ether anesthesia remember its unpleasant features more distinctly than those of the operation, and do not fail so to express themselves to their friends. Thus both patients and friends often come to dread the anesthesia more than the operation. This premonitory fear—and most physicians do not realize how much fear often exists—is highly conducive of shock and greatly increases the very features of which they are in dread.

Nitrous oxide, on the other hand, possesses only a little of a few of these

ble qualities, and none at all of most of
n, and it usually leaves a pleasant
ression upon the patient's mind, hence
s universally known as "laughing gas."

nitrous oxide has disadvantages pecu-
to itself, the chief of which lies in the
alting anesthesia, which is not of suffi-
t depth to serve alone in many cases.

preliminary medication by morphine and
pine, or preferably morphine and a
all dose of scopolamine (1/200 gr.) ren-
s nitrous oxide anesthesia deeper and
other, and ought always to be used in
prolonged administrations. If this does
produce sufficient depth of anesthesia
r should be added in small amounts, as
adjuvant to the nitrous oxide. The
esthesia is thus quickly deepened to any
ired degree.

y administering nitrous oxide through-
and adding the least amount of ether
essary to produce the required relaxa-
and depth of anesthesia, the toxication
he anesthetic is reduced to a minimum.
comparatively small amount of ether
s used does not produce the proportional
cation that this amount bears to the
unt of straight ether required. The
ifest toxication of drugs is not always
proportion to the amounts ingested. The
em will tolerate poisonous substances
out evidence of toxication up to certain
unts, varying more or less with each
vidual; then additional amounts show
cation in much greater degree than
itional amounts bear to the amounts well
rated. The amount of ether required
an adjuvant to nitrous oxide is so small
it is below the threshold for the mani-
ation of ether toxication in most cases,
in the cases where this amount is not
ow this threshold, straight ether would
duce much more pronounced toxication.
he most scientific, and therefore the
ferable, method of administering ether
inhalation is the closed method with
gen.

n operation within the chest, throat, and
cal cavity, and about the face, the pre-
ferred method of administering ether is by
fflation.

Preliminary medication with nitrous ox-
ide anesthesia and with a minimum of
adjuvant ether when necessary is lighter,
less toxic, and therefore preferable to
straight ether anesthesia, from the view-
point of the patient's physiology.

The system of anesthetization that is pro-
ductive of the best results is anociation.
This particular part of anociation consists
of four essential and distinctive factors:
preliminary medication, nitrous oxide gen-
eral anesthesia, perfect local anesthesia, and
gentle manipulations. Not one of these
factors may be omitted or altered without
compromising results, and passing beyond
the pale of anociation.

THE SIGNIFICANCE OF XANTHOCRO- MIA OF THE CEREBROSPINAL FLUID.

SPRUNT and WALKER (*Johns Hopkins
Hospital Bulletin*, February, 1917) observe
that they have called attention to the clear,
yellow spinal fluids occasionally observed at
lumbar puncture. Their remarks are based
on five cases observed and reported and an
analysis of 100 cases from the literature.

The fluids may be divided into two main
groups:

Those in which the color is due to dis-
solved hemoglobin or its derivatives, and
which as a rule do not coagulate spontane-
ously and contain only a small amount of
globulin. Such fluids usually are associated
with brain tumors in contact with the men-
inges or ventricles.

The larger and more important group
comprises those cases showing the so-called
Froin's syndrome, in which the fluid is
transparently clear, yellow, coagulates spon-
taneously, contains large amounts of glob-
ulin, may or may not show pleocytosis, and
gives no positive tests for hemoglobin.

This is a "compression syndrome," its
main determinants being the isolation of a
lumbar cul-de-sac, in which the spinal fluid
stagnates, and probably some vascular
changes within its walls.

Clinically, with negative x-ray of the ver-
tebral column, it is strongly suggestive of a

tumor of the spinal cord, although it may also be associated with intradural inflammatory processes.

WHEN TO USE THE CURETTE IN INFECTED ABORTIONS.

POLAK (*American Journal of Obstetrics and Diseases of Women and Children*, March, 1917) states that in the clean cases after securing free cervical dilatation, complete evacuation of the uterus by means of the curette, forceps, and finger, under a strict aseptic surgical technique, and the firm retraction of that organ, will leave the woman in the ideal condition to avoid complicating morbidity, provided she was not the subject of gonorrheal endocervicitis at the time of the miscarriage. The majority of abortions that are seen in practice, both in the hospital and on the outside, are not primarily clean, in that they have been examined or packed through an unprepared vulvovaginal orifice.

In the infected cases wise conservatism is followed by an amazing decrease in both mortality and morbidity, the patients usually expelling the uterine contents, the bleeding ceasing, the temperature dropping to and remaining normal. In the follow-up system he found that these patients complained of menorrhagia, sometimes very severe, for several periods following discharge from the hospital. For years it has been taught that curettage for an incomplete abortion, which is presumably infected, is an unsafe procedure. His cases in which the abortion began outside the hospital and were examined or packed one or more times through an unprepared introitus, were all infected. If the hemorrhage were negligible they were treated by the expectant plan.

The patient is put to bed in the Fowler position and an ice-bag placed over the uterus. If the bleeding is considerable a sterile gauze vaginal tampon is firmly introduced against the cervix. This usually controls the hemorrhage and causes the expulsion of portions of the secundines. Several severe bleedings after the patient

had left the hospital caused the author to modify the routine. At present when a bleeding case is admitted a thorough vaginal preparation is made and the interior of the uterus cultured. If this culture returned negative, the uterine contents are carefully evacuated after administering hypodermically, an ampoule of pituitrin. This evacuation is accomplished with the curette or placental forceps when the pregnancy is of eight weeks or under, and the placental forceps and finger when past this period. Following this evacuation the interior of the uterus, which is relatively bloodless if pituitrin has been used, is iodized, by packing the interior of the uterus with gauze soaked with tincture of iodine. This pack is allowed to remain in place for twenty minutes. The routine culture of the uterus has shown more than 60 per cent of the staphylococcus or streptococcus. In such culture has been made from the uterus eight hours to four days after the spontaneous miscarriage. Several women from whom a positive culture of the streptococcus was obtained were curetted as controls without any local reaction in the uterus or parametrium.

As a result of these culture investigations Polak concludes that where pathogenic organisms have been demonstrated in the uterus, the expectant plan of treatment should be employed until a culture from the interior of the uterus shows no organisms to be present, when the cavity of the uterus may be curetted and carefully iodized.

ANXIETY ABOUT THE LUMBAR PUNCTURE.

NEWMARK and BEERMAN (*Medical Record*, April 28, 1917) state that the attending a lumbar puncture in a case of intracranial tumor, especially when the growth is in the cerebellum, is well known, but he holds that it should be known that when the tumor is intracranial the effect of the puncture may be to seriously increase the compression of the brain. This happened in an instance reported by Nonne, to such a degree that the

became paralyzed in all four limbs, and, in spite of the immediate removal of the tumor, lost his life.

In one of the authors' cases in which there was an intradural psammona opposite the second dorsal spinous process, the paresis of one of the lower extremities was converted into complete paralysis after they had removed about 6 Cc. of fluid.

In another case of compression of the cord by the same kind of tumor they had to answer for very severe consequences. In this case they observed that a "dry tap" may be as productive of serious results as a copious flow of fluid. The patient was a young woman who complained of a slight weakness of one foot, but she walked without conspicuous trouble and was even able to dance. One serologist having found the Wassermann reaction of the blood serum positive and another negative, and each on repeating the test adhering to his first result, a decision was sought from the spinal fluid. One of the serologists inserted the needle several times without obtaining fluid, with the patient at first in the lateral and then in the sitting posture. On the following day the girl complained of headache such as would be expected after the evacuation of the liquor; her legs, moreover, began to get weak, and in three days after the puncture there was almost complete paralysis of one lower extremity, paresis of the other, and anesthesia. They heard ominous mutterings about their having "punctured an important nerve," and with the consequent impairment of their *crédit* found it difficult to obtain consent to an operation for the removal of a tumor which the sequel of the puncture had enabled them to diagnose and localize. Eventually the growth was removed by Dr. Harry M. Sherman and the patient recovered completely. In the light of the issue the puncture was seen in both of these tumor cases to have been advantageous to the patients, by increasing the compression of the cord and indicating more exactly the level of the lesion; the second case was "matured," so to speak, and the cure of the patient hastened, perhaps by months.

In two other instances, one of cerebrospinal syphilis and the other perhaps of multiple sclerosis, a puncture which failed to produce fluid was nevertheless followed by severe headache. In the second of these cases they learned from the patient that the puncture which had been performed several months before had caused intense pain in the back of the head for ten days; they punctured her without difficulty and withdrew about 3 Cc. of fluid, and caused her no subsequent suffering at all, so that they have the curious case of a "dry tap" occasioning much distress while a productive one was tolerated with ease.

They have done lumbar puncture when there was compression of the cord by an intradural tumor, without observing any exacerbation, and have read of many other cases in which the puncture was made with impunity. On the other hand cases might be adduced to show that sudden, or at least rapid, aggravation may occur, unprovoked by any deed of the doctor. Hence the question may arise whether we may not be dealing with a coincidence when the lumbar puncture has seemed to precipitate a disaster.

For the benefit of some unfortunate physician who may desire to plead a mere concurrence of events without causal relation, when he finds himself in the plight they are trying to illustrate, they mention the case of a woman who had a hemiparesis which had come on rapidly a few days before they saw her. There were no headaches, no choked discs or other signs of pressure, and one got rather the impression of a vascular disease than a growth. After deliberating for ten days the authors determined to get what information lumbar puncture would furnish and set a morning for the little operation; but on their arrival they found that in the night violent headaches had set in, the paresis had developed into absolute paralysis and papillitis, and a slow pulse signified the acute increase of intracranial pressure. Had they been less tardy in their resolve to do the puncture, by only a few hours, there would have been no means of absolving

themselves from responsibility for the woman's grave condition. Indeed, they should not have doubted it themselves, and should have been charged with it by others. The patient died a month later, and they show by reproduction of a Weigert section through both hemispheres how a large sarcoma of the thalamus may exist without those symptoms of increased pressure which might warn the doctor against doing that which he may be sorry for.

A PLAN FOR THE PREVENTION OF VENEREAL DISEASES.

WOLBARST (*Medical Record*, April 28, 1917) offers the following plan:

There shall be established a medical department or service within the regular medical service, which shall deal exclusively with the venereal diseases. This department shall be in charge of an officer (not necessarily but preferably from the regular army medical corps) of executive ability, who has in addition experience with the venereal diseases and their prophylaxis. Each division, brigade, and regiment shall have its venereal officer, who shall be responsible for his particular unit. The number of venereal officers to be attached to the respective units to be determined by the authorities experienced in these matters. One officer would probably be sufficient for a regiment, possibly two or more.

Taking the regiment as a convenient unit for the purpose, prophylaxis would be carried out as follows:

Instruction to be given to all men of the regiment in the subject of venereal diseases, their consequences, sequelæ, etc. This instruction to be repeated at frequent intervals and reinforced by the liberal use of prophylactic literature, moving pictures, slides, etc., dealing solely with the medical side of the question.

All women known or suspected of being lewd, whether professional or clandestine, to be ordered and kept away from camp for a prescribed distance (as practiced with much success in some sectors on the Mexican border during the recent mobilization).

If found within the forbidden area are to be apprehended and subjected to rigid physical examination; and diseased they are to be sent to the hospital. On their discharge, if found a second time within the forbidden area they are to be imprisoned.

No alcoholic liquors to be sold within the forbidden area; no saloons, no licensed man, under severe penalty; no drinking within the forbidden area they are to be sent to the camp. Any soldier smelling of alcohol is to be intoxicated to be severely punished.

Any soldier that develops a venereal disease shall be punished. This rule needs some explanation. It is believed that the methods of prophylaxis here described will serve to prevent in the army a large proportion of cases, and perhaps 100 per cent of cases, when properly employed. If infection results, the evidence of improper "disinfection" on the part of the subject of the disease, or of the officer in charge of the "disinfection." In either event, it being the duty of the soldier to see that he obtains proper prophylactic treatment, failure to do so brings with it the prescribed penalty.

Adoption of a rule, providing for rewards or privileges for those who do not acquire venereal disease. In other words, reward those who remain uninfected, and punish those who become infected. The question of abstinence or continence is not to enter into consideration. When a man indulges and by the use of proper measures avoids infection, or when he abstains and thereby avoids infection, this should not concern the medical men. The important thing is that he has avoided infection, and for that he is to be rewarded. The fact that he has remained free of venereal disease for a certain period entitles him to certain privileges and so long as he remains uninfected. This should encourage abstinence or proper prophylaxis.

Every man to be provided with a prophylactic, such as has been used with such signal success in the army and particularly the latter. This is to be accompanied with the usual instructions, and in case he indulges in sexual intercourse

On his return to camp, whether he has had intercourse or not, he is to be given a mercurial inunction of the penis and an intravesical irrigation of some mild antiseptic, such as permanganate, argyrol, protargol, etc. This is based on the theory that his leaving the camp is to be construed as sufficient presumption of possible exposure and infection, and therefore as sufficient justification for the adoption of suitable protective measures. The particular form of these protective measures—"disinfection," in other words—is immaterial. This may be left to the discretion of the venereal officer in charge; the important thing is to see that every man who has left camp for any purpose, and has returned, is disinfected, so to speak, so that he shall not bring venereal infection into camp with him.

It shall be the duty of the venereal officer to see to it that this "disinfection" shall be properly and strictly administered and properly followed up by careful physical examination every day thereafter until all danger of infection has been eliminated.

The venereal officer, or one of his subordinates, shall examine every man daily for venereal infection; this to consist of the examination of the external genitals for any evidence of lues, and an inspection of the urine, in two glasses, for the presence of evidence of gonorrhea.

If a man is infected, in spite of these prophylactic measures, it shall be the duty of the venereal officer to locate the woman through whom the man was infected. Whatever her station in life, she shall be apprehended, carefully examined, and if found diseased, she shall be sent to the hospital; if she is found within the prohibited area, she shall be punished by imprisonment after she has been discharged from the hospital; if not within the forbidden area, she shall be warned to keep away from the men thereafter, on penalty of imprisonment if discovered. The object of this regulation being that any woman who harbors infection is a menace to the health of the army and must be treated as such—first cured, and then punished.

It is assumed that every man, on enlist-

ment, is examined by a medical officer for latent gonorrhea and lues. If evidence of either disease is found, he is to receive appropriate treatment; but this treatment need not bar him from his regular duties of training, etc.

It is assumed that the camp hospital will contain ample provision for bed-treatment of complications, such as epididymitis, etc., and for the administration of salvarsan, etc.

The personnel of the venereal service will require some attention. Conceivably, the regular medical corps will devote their full time to sanitation and treatment of the sick and wounded; it would, therefore, appear desirable that the venereal service be placed in the care of civilians who have specialized in the venereal diseases. Inasmuch as the training camps will most likely be situated not far from our big cities, it will not be difficult to secure the services of such specialists for the venereal service. Particularly will this be possible if arrangements can be made whereby men with family responsibilities need not give up their full time to this work. In view of the character of the venereal work, it is conceivable that an officer may attend his duties by giving up several hours a day, thus alternating with another colleague who also gives up several hours daily. Continuous attendance will not be required in the performance of this work; expert supervision and technical ability are, however, very important. In any given regiment or larger unit, if it were found that a venereal officer could take care of, say, 500 men by visiting the camp every morning, his colleague could take care of 500 additional men every afternoon. In this manner experts could be obtained whose services in this particular field of endeavor could not be had in any other way.

The venereal officer would have under his immediate direction a number of orderlies, or preferably medical students, who would give up all of their time to this service and carry out the orders of the venereal officer. Intelligent enlisted men, who in civil life were clerks, salesmen, bookkeepers, etc., could very readily be trained to perform some of these duties with satisfaction. With

the help of intelligent assistance it is conceivably possible for one venereal officer to assume charge of several thousand men, even more possibly, the actual work being done by his subordinates, under his immediate supervision.

Operative work following in the wake of venereal complications, such as prostatic abscess, epididymostomy, etc., could be done either by the venereal officer in the venereal pavilion set aside for this purpose, or by mutual agreement could be transferred to the general surgical service, the patient to be returned to the venereal service when discharged. This is a matter of detail which does not affect the general plan to any extent.

IMMEDIATE AFTER-TREATMENT OF THE GUILLotine AMPUTATION STUMP.

WOOLFENDEN and CAMPBELL (*Lancet*, April 14, 1917) observe that the guillotine amputation stump usually arrives in the base hospital with a not inconsiderable amount of retraction of the skin, more especially after it has been treated for several days without any effort being made to prevent the retraction. Any extension applied to the skin in order to be really effective should commence immediately after operation, be continuous, and result in a more or less complete covering in of the stump. These ends seem to be most satisfactorily attained by the following method, which the authors have used for a long time in such cases in the hospital with which they were connected:

On the completion of the amputation each of the quadrants of skin is perforated with the knife by a pair of stab incisions about 1 inch apart and $1\frac{1}{2}$ inches from the edge, and a loop of sterilized tape 10 inches long is passed through each pair of perforations so that the tension is borne by the sur-

face of the skin when the loop is pulled. The loops of tape are gently pulled by the assistant and the stump is and firmly bandaged. After this the is placed in an ordinary Thomas arm splint and supported in the usual position. The loops of tape are then attached to the end of the splint by fairly stout rubber tubing tightened to the required degree, and altered from time to time. Any subsequent dressing can readily and easily be accomplished without slackening the extension, merely removing the dressing from between the loops of tape. On the second or fourth day the tapes are removed and the extension is kept up by strips of collodion bandage. To the edge of one end of the strip are attached a pair of ordinary hooks. These pieces of bandage are attached to the skin by collodion with the hooks placed about one or two inches from the skin edge. A loop of tape is then passed around the hooks and rubber applied to the fore. The hooks and collodion are changed every two or three days. It is important that the skin should never be allowed to retract when changing the hooks; this can be prevented by an assistant keeping the skin drawn down. The purpose of the elastic extension is to maintain a continuous pull on the skin as it stretches under the extension.

By the above means every guillotine amputation can be easily transported, and every stump almost completely covered when discharged to England (more especially if short flaps of $\frac{3}{4}$ inch to 1 inch have been made at the time of the operation). The stay of the patient in hospital can be considerably diminished, and the necessity of frequently shortening the stump obviated. At any rate the amount of bone requiring removal much lessened. In addition the stump is considerably steadied, with consequent greater comfort to the patient.



REVIEWS.

THE ELEMENTS OF THE SCIENCE OF NUTRITION.
By Graham Lusk, Ph.D., Sc.D., F.R.S. Third
Edition, Illustrated. W. B. Saunders Co., Phil-
adelphia, 1917. Price \$4.50.

Professor Lusk is one of the leaders, if not the leader, in nutritional studies in this country. The first edition of his book appeared ten years ago. The advances which have been made in regard to our knowledge of metabolic processes during this period have been great, and we are glad to say that, through the liberality of wealthy persons, this science has been advanced more rapidly within recent years in the United States than ever before, notably by Mrs. Russell Sage and the Trustees of the Russell Sage Institute of Pathology.

It is interesting to note that at the close of his preface the author makes the promise, which few other authors have ever made, namely, that he has no intention of again revising this book, because in another decade he believes that the development of scientific knowledge will permit the formulation of the subject from the standpoint of physical chemistry. He hopes that the joy of the labor may be as great to him who next reviews the subject as it has been to himself.

The volume contains twenty-one chapters, with an appendix and index. In the introduction it is pointed out that the early scientific observations upon nutrition were founded upon the commonly known fact that in spite of the ingestion of quantities of food a normal man did not vary greatly in size from year to year. After the introductory chapter the colorimeter, which is such an essential piece of apparatus in the study of nutritional processes, is described in detail, and then follow chapters upon starvation, regulation of temperature, the influence of protein food and of the ingestion of fats and carbohydrates, the influence of mechanical work on metabolism, and a discussion of normal diet with the nutritive value of various materials used as foods. Possibly the author did not intend to make this an exhaustive chapter, leaving the con-

sideration of this subject in detail to books on dietetics. We wish that he might have made it longer. One of the most interesting chapters, of course, is that which deals with metabolism in fever, and that upon the changes in nutrition in gout. In this connection it is interesting to note the dogmatic statement of the author that it is impossible to oxidize uric acid and no treatment now known increases its solubility; and, again, that the present doctrine concerning metabolism and gout may shortly become entirely obsolete through new and far-reaching discoveries. The chapter upon the influence of certain drugs upon metabolism is distressingly brief, covering less than two pages and quoting only two researches. In the appendix an immense amount of information is given as to the composition of ordinary food materials.

We do not know whether a publication of this kind is capable of increasing the reputation and standing of an author who has already reached the top notch as to scientific reputation. If such a thing is possible the third edition of Dr. Lusk's work bids fair to place fresh honors upon him.

EXPERIMENTAL PHARMACOLOGY. By Dennis E. Jackson, Ph.D., M.D. C. V. Mosby Company, St. Louis, 1917.

We are told in the preface that the writer has had a growing conviction for several years that the teaching of pharmacology might be greatly facilitated, and rendered much more effective and comprehensive, if each student could have in his hands a laboratory manual giving exact, specific, detailed directions for carrying out most of the experiments which he is called upon to perform in the study of this subject. He has, therefore, given us a working manual for undergraduate students of pharmacology in which experiment after experiment is given, extending up to 168 sections, but dealing in reality with many more experiments than this number.

In part two he describes equipment of the shop work necessary and deals with

photography in making records. Last of all he gives a list of dealers in equipment and supplies.

Naturally a large part of the work deals with the frog, but experiments upon the dog, cat, turtle, and rabbit are also included. Unlike some of the works in experimental pharmacology, this one is essentially what it claims to be, a working manual.

The colored plates, of which there are no less than twenty-four, give excellent illustrations of the incisions which are to be made, and the vessels and nerves which are to be operated upon or otherwise manipulated.

At the present time it is the fashion to teach undergraduate students pharmacology. From a fairly large experience we believe that it is being carried to excess. In no medical school is there sufficient time in existence for the putting aside of enough hours to make competent pharmacologists out of any of the students. Unless a man has a somewhat extraordinary bent for experimental work he can no more become an accurate, scientific investigator than an ordinary individual can become a violinist, and, in the majority of instances in our experience, the so-called student of pharmacology does not even become a fiddler. What is needed is a certain amount of pharmacological work in sections, the actual work being largely done by a competent instructor, who can then transfer his class to the wards of a hospital where the physiological action and therapeutic use of drugs are given practical application. The student is thereby taught the practical use of remedies and is taught efficiently how they act without wasting precious time in repeating old experiments, which he will inevitably do very badly unless he has so much assistance that the instructor might as well do the whole work himself.

For students who wish to become pharmacologists, or for students who have to perform so-called pharmacological investigation in order that they may take one more step toward their medical degree, this book is to be highly recommended. The author has succeeded in preparing text which will

prove useful and instructive, and if a certain pathway is to be followed, we believe that this is the best guide-book yet published which can be utilized in following

MEDICAL CLINICS OF CHICAGO. Volume 2, March, 1917. Volume 2, No. 6, May, 1917. W. B. Saunders Company, Philadelphia.

As our readers know, the object of the "Clinics" is to present the profession in these so-called "Clinics" with the facts, theories, and opinions stated by various medical and surgical clinicians in the hospitals of Chicago. There are thirteen contributors to the present volume, which contains two hundred pages, and which deals with a large number of subjects, several being discussed in each.

What has just been said in regard to the March issue holds true in regard to the present issue, although, of course, a different set of clinicians make the contributions. The issue also contains a very copious index of the material of all the clinics which have appeared in Volume 2, and, with this index, covers about 250 pages.

THE INTENSIVE TREATMENT OF SYPHILIS BY THE LOCOMOTOR ATAXIA BY AACHEN METHOD. Reginald Hayes, M.R.C.S. Second Edition. Revised. Bailliere, Tindall & Cox, Ltd., London, 1917. Price 3s. 6d.

This little book contains eighty pages and four plates, and has much to say with the employment of inunctions of mercury in the treatment of syphilis, although the author distinctly states that inunction must not be considered in any way as a substitute for the injection of salvarsan and other worthy arsenical preparations. One of the objects of the author, often overlooked, is to impress upon us the necessity of giving the inunction well. Much of the treatment by this method fails through carelessness or ignorance as to the proper use of inunctions, and it is for these reasons that Hayes believes that much of the uncertainty of results exists to-day. The Aachen method Hayes means the injection of thirty-three and a third per cent. mercurial ointment by the bare hands of a skilled rubber under proper medical supervision, and in addition the use of salvarsan water internally and externally as it

ministered at Aachen. This is the essential thing or foundation upon which the treatment is based.

CONGENITAL WORD BLINDNESS. By James Hinselwood, M.A., M.D. H. K. Lewis & Co., London, 1917. Price 4s.

This is an essay upon a subject which is comparatively little known. The author has thought it advisable to gather together in book form the studies and observations which he has made, and to combine them with the contributions which have appeared in various medical journals during the last twenty years. The book contains five chapters dealing with acquired word blindness, congenital word blindness, hereditary congenital word blindness, its diagnosis, prognosis, and treatment. He opens with a somewhat historical account of the subject, and then proceeds to the discussion of the lesions and symptoms which are present in patients suffering from this interesting disorder. Contrary to the belief of some writers, he thinks that to overcome word blindness is not a hopeless proposition, believing that in nearly all cases children so affected with proper treatment and perseverance can be taught to read. To those who are interested in this subject this small contribution will doubtless prove of value.

MUSCLE TRAINING IN THE TREATMENT OF INFANTILE PARALYSIS. By Wilhemine G. Wright. Ernest Gregory, Boston, 1916. Price 25 cents.

The authoress of this little manual is a graduate of the Boston Normal School of Gymnastics and the Orthopedic Clinic of Hoffa, in Berlin, and, what is more important, is an assistant of Dr. Robert W. Lovett of Boston. She has prepared an interesting little brochure in which the practical details of treating loss of power due to infantile paralysis are carefully considered, definite directions as to exercises being given for practically all the important muscles in the neck, body, and limbs.

The remarkable result which can be obtained by careful, persistent, and patient training of the muscles which have lost power, or of other unaffected muscles which can be made to do some of the work of

those which are paralyzed, is one of the notable things in connection with modern methods of treating disease. Doubtless many practitioners will be glad to have this brief, yet clear, description of what they can direct intelligent mothers and nurses to do for their patients, after the acute stages of poliomyelitis have passed by.

ROENTGEN TECHNIQUE. By Norman C. Prince, M.D. With 71 Illustrations. C. V. Mosby Co., St. Louis, 1917. Price \$2.00.

This is a handsomely gotten up manual of 140 pages dealing with the subject included in its title. The number of illustrations take up a very large amount of space, and as the type is large and heavily leaded the book does not contain much text. After a consideration of the general principles which govern the technical use of the roentgen rays, the author describes *x*-ray tubes, operation of the machine, general routine methods of examination, positions and exposures which are to be made, the location of foreign bodies, and dark-room procedures. The sixth chapter is possibly one of the most important, in that it deals with sinus disease. Careful directions are given as to the use of a special bismuth paste to determine the presence of the conditions which may be causing much suffering, or even endangering life.

PRACTICAL MEDICINE SERIES, 1917. Volume One. General Medicine. The Year Book Publishers, Chicago, 1917. Price \$1.50.

As we have pointed out in previous years, the present volume is one of a series of ten due at almost monthly intervals, designed to cover the entire field of medicine and surgery, under the editorial charge of Dr. Charles L. Mix. This volume, edited by Dr. Frank Billings, assisted by Dr. B. O. Ralston, is designed to give us a summarization of medical literature, in distinction from surgical or special medical literature, for the past twelve months. The foot-notes clearly reveal the universal difficulty of writers in dealing with anything else except English and American medicine, since literature from the Continent of Europe is practically no longer obtainable. The volume

maintains the high quality which its predecessors have possessed, and we hope that it will continue to be appreciated by the profession.

DIAGNOSTIC SYMPTOMS IN NERVOUS DISEASES. By Edward Livingston Hunt, M.D. Second Edition, Revised. W. B. Saunders Company, Philadelphia, 1917. Price \$2.00.

When the first edition of this little book appeared we referred to it in complimentary phrases. As its title indicates, it is not an exhaustive manual dealing with nervous diseases. In its three hundred pages, with wide-spaced type, it deals with the diagnosis of functional and organic diseases of the nervous system. Its illustrations are definitely clinical, taken directly from patients. It is a first-rate little condensed manual of the subject of which it treats.

PHYSICAL EXERCISES FOR INVALIDS AND CONVALESCENTS. By Edward H. Ochsner, Ph.D., M.D., F.A.C.S. C. V. Mosby Co., St. Louis, Mo. Price 75 cents.

Dr. Ochsner is known for other things than the subject with which this little manual deals, for the text only covers fifty-four pages, or, to speak more correctly, there are only fifty-four pages between the covers. The average page contains five to six lines of text, and the balance is an illustration of the attitude or exercise which should be taken by the patient to develop various muscles and keep himself in good trim.

DANGERS IN NECKWEAR. By W. G. Walford, M.D. H. K. Lewis & Co., London, 1917. Price 4s.

We learn from the title-page that the author of this book, with its somewhat remarkable title, is also the author of another upon Cerebral Congestion and Tight Neck Clothing. He takes two hundred pages to consider the subject with which he deals, and gives a number of illustrations as to the changes which can be produced in the neck by relieving pressure exercised by tight collars or bands. We confess that we cannot help feeling that the mountain has been in labor and has brought forth a

mouse. There may be some doubt about the mountain, but there is no doubt about the mouse.

NOTES AND QUERIES

GOVERNMENT RULING AS TO SYNTHETIC DRUGS.

The *California State Medical Journal*, May, 1917, prints a letter of instruction from the Treasury Department:

To the Collector of Internal Revenue, Agents, and Others concerned:

Referring to T. D. 2194, holding that any synthetic substitute for cocaine, or beta eucaine, or their salts or derivatives, comes within the provisions of the act of December 17, 1914, and that persons having in their possession any such synthetic substitute are required to register and obtain such substitutes upon order forms and otherwise conforming to the act, this office has decided to suspend enforcement of the ruling of December 17, 1915, until you are otherwise advised.

This action is taken in view of the decisions of the U. S. District Court, District of New York, of June 1, 1915, and of the Circuit Court of Appeals for the Second Circuit, of February 1, 1916, holding that these synthetic substitutes do not come within the provisions of the act.

W. H. OSBORNE,

Comr.

Approved:

W. G. McADOO, Secretary.

CORRESPONDENCE

A CORRECTION IN DR. BOYD'S ARTICLE IN THE JUNE ISSUE

To the Editor of the THERAPEUTIC GAZETTE:

SIR: In transposing the first number of dilutions accompanying the chart from the top of the page to the bottom an error was made in the number of dilutions. It is printed "V" instead of "VI." The note should read "When a reaction occurs . . . begin with the next dilution, in this case 'VI,' not 'IV' as it is now printed."

NEW YORK,

ELLIS BONIM

THE THERAPEUTIC GAZETTE

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ORIGINAL COMMUNICATIONS.

THE SURGICAL TREATMENT OF PELVIC INFECTIONS AND WHEN IT SHOULD BE EMPLOYED.

BY E. E. MONTGOMERY, M.D., LL.D., F.A.C.S.,

Professor Gynecology Jefferson Medical College; Gynecologist to Jefferson and St. Joseph's Hospitals.

The knowledge of pelvic infection, its source and origin, has been confined to the last four decades. Inflammation of the pelvic structures had long been known and studied, but without a proper appreciation of its causes. With the introduction of the known responsibility of microorganisms for all inflammatory changes so generously furnished the profession by Pasteur came the information furnished by such pioneers as Lawson Tait, and so brilliantly demonstrated and promulgated as to sweep the medical world with the conviction that surgery, and surgery alone, afforded the panacea required for the relief of all such infective processes. This idea was confirmed and apparently justified by the statements of such investigators as Noeggerath, that gonorrheal infection once extended to the uterine appendages was never cured. As this form of infection was directly or indirectly responsible for the great majority of pelvic infections in the woman, the conclusion that the infected uterine appendages should be removed seemed a proper one. As such an infection was regarded as incurable after the invasion of the uterine mucosa, disease of one tube was asserted by Tait to be a proper reason for the removal of the unaffected one, as the latter would soon become infected from the extension through the diseased uterine canal, so that it was an economic process to remove it while the abdomen was open. So widely was this idea promulgated and ac-

cepted that it began to be feared the future of the race would be affected by the number of women sterilized. Experience fortunately demonstrated the fallacy of these views, and it is with the purpose of formulating what may be considered saner principles of treatment that this article is written.

By surgical treatment has been understood sacrificial measures. Accepting the view that the condition was incurable, the retention of organs in which the infection could be fostered and from which its distribution could be promoted was worse than folly, hence a radical operation; but when it was demonstrated that the progress of the infection could be not only arrested, but the function of extensively infected organs also restored by palliative measures, the human waste produced by such measures became woefully manifest. Peritoneal accumulations, localization of pus in a tube or ovary, accessible through the vault of the vagina, made it seem desirable that such collections should be drained previous to any radical procedure, and not infrequently the patients would be so much improved they would refuse further treatment. The complete recovery of such patients led both physician and patient to regard such tentative treatment more desirable than a radical measure. Its advantages were that the barriers which nature had erected against spread of infection were respected, the collection was evacuated in the direction of least resistance, and the patient was saved further absorp-

tion of toxic products. The important considerations were that the incision should be free so that there should be no opportunity for retention of the products of suppuration, that all pockets should be broken open and the retention sacs spread out, that the cavities should be well packed with gauze supplemented by split tube drains.

This procedure was not always free from danger, as the procedure was more or less a blind one. It was not always easy to differentiate a tubal collection from a distended coil of intestine. No puncture should be made until the sac is so outlined and its connection with the uterus certain as to leave no doubt of its relation. Puncture of an intestine need not, however, be considered as reason for immediate abdominal incision, as it will close frequently without any trouble further than the immediate annoyance. All such openings tend to close of themselves unless there is an obstruction of the lumen of the gut lower down, in which case it will remain open and the bowel contents make their exit in the direction of least resistance. When, however, whether from twists of the bowel, bands of adhesions, or masses of exudate the caliber of the intestine is contracted, the fistula will prevail until the intestine is loosened. Drainage of pelvic collections is a very important consideration in the arrest of a spreading infection. Where such a collection is recognized through the posterior fornix of the vagina the latter should be opened early and the drainage supplemented by continuous instillation of salt solution (Murphy) per rectum, with the patient in the Fowler position. The salt solution passes rapidly through the walls of the intestine and thus washes the peritoneal cavity. Proctoclysis used without drainage should be carefully watched to see there is a proportionate escape of the water through the urine, as otherwise there would occur an ascites. I have seen the abdomen become greatly distended with fluid where this precaution was not observed. As indicated in a previous article, surgery should not be resorted to when the disease is not localized, nor in acute processes, unless a collection, as has

been indicated above, can be reached through the vagina without danger of breaking down nature's barriers.

Operation is indicated when the collection is localized by a palpable collection in the pelvis, tubes, ovaries, or the uterine wall. Probably the most frequent seat of collection is in the pouch of Douglas, leading to the extension of infection through the tubes, infecting the peritoneum, causing local peritonitis which is quickly walled off and may form quite a large mass which may lead to thickening of the peritoneum, extension to the extraperitoneal cellular tissue, and the formation of small pockets of pus and very extensive exudate. Pressure should be made upon the bladder or rectum, relieving great distress, and such collection should be broken into one or the other, greatly improving the condition and adding to the comfort of the patient. Ischiorectal and prevesical abscesses may result, and must not be overlooked unless the surgeon is careful and guard in making the investigation. A tubal abscess is, next to the collection in the pelvis, probably the most frequent. The virulence of the infective process leads to rapid sealing of the tubal ends, and the accumulation in the tube forms a pyosalpinx. Not infrequently the wall is permeated with pus, greatly thickened, the adjacent structures become infected, and, in the effort to prevent the spread of the inflammation to the intestines, omentum, bladder, and other organs, assist in forming the wall. Infection of the uterine sinuses not infrequently leads to multiple or miliary abscesses in the wall of the uterus and extensive dissemination; the abscess formation through rupture and escape of its contents into the peritoneal cavity or its dissemination through the periuterine cellular tissue results in a rapid loss of vitality, and very frequently in the loss of the life of the patient.

The method of treatment must necessarily depend upon the site of the disease and the extent of the lesions. As has been indicated, the evacuation of the focus through a vaginal incision may sometimes be successful, and should be employed when it will serve the purpose of easy access to the

dition. When the tube or ovary is the seat of the lesion and the more acute symptoms have subsided, the abdomen should be opened and the offending tube removed. But suppose that one tube is so destroyed that there is no question as to the wisdom of its removal, and the other tube with its abdominal end open but vomiting milky or purulent fluid appears a serious menace, what shall be done? Tait would have answered that as the infection reaches the tube through the uterus, the second tube, though it be free from inflammation, will become infected and consequently should be removed to prevent the patient suffering inconvenience, and the probable necessity of a second operation. The evident infection of a tube, then, should be considered a positive indication for its removal. Experience, however, has disclosed that such cases under proper measures will recover without sacrifice of the structures and will have the function restored. The plan of treatment I have successfully instituted in a large number of cases has been to milk out the contents of the tube into some pads of gauze protecting the peritoneal cavity from infection. The tube is firmly squeezed so that the exudate from the thickened mucosa is forced out through the tubal orifice. The cases have recovered without any disturbance of convalescence. The effort should be made to save, rather than to sacrifice.

In patients in whom the tubes are closed but the acute inflammation has long subsided, leaving them slightly distended with serous contents, the adhesions should be broken up and the closed tube incised on its convex surface longitudinally. This procedure is preferable to the method of cutting off the end and suturing the mucous and peritoneal surfaces. The longitudinal incision results in an eversion of the mucosa due to the contraction of the circular fibers of the tube, necessitating only a stitch on either side to maintain the opening. Such an operation should not be considered if the tube were filled with pus as the destructive state would preclude restoration to a healthy condition, and if retained would endanger the health and life of the patient.

In all operative procedures the greatest precaution must be observed to prevent the spread of infection, and where necessary drainage promoted. Drainage was formerly practiced through the lower part of the wound, but we now employ wherever possible vaginal drainage, because it empties by gravity the most dependent portion of the peritoneal cavity, that to which contained fluids gravitate.

When the tubes have been destroyed by the inflammatory changes and their retention is likely only to prolong the suffering of the patient, and even endanger her life, the wisdom of their removal is not to be questioned. Even in such cases it is better, where possible, to retain an ovary or portion of one so that the change of life shall not be too overwhelming. The well-accepted theory that the ovaries furnish a secretion which with that of the other internal glands influences and governs vasomotor action makes it desirable that this balance shall not be unduly disturbed. Cases occur, however, where it is impossible to consider such action, and then the unpleasant symptoms must be counteracted if possible by other measures. This action is a want of coördination of the vasomotor functions, manifested by hot and cold flashes, chills, gasping for breath, irregular heart action, giddiness, faintness, and disturbance of mental action. The mental disturbance may vary from hysteric manifestations to absolute mental derangement.

The condition demanding the removal of the ovaries may well be considered in many cases as requiring partial or complete removal of the uterus. The latter organ is no longer of advantage, and when hypertrophied and the seat of infection by pressure upon the imprisoned nerves in subsequent contraction may be the cause of marked disturbance of the nervous system. When the cervix has been the seat of lesions, as extensive lacerations with eversion of the mucous membrane, or where there is considerable glandular degeneration of the cervix, the entire organ should be removed, for these are the cases in which carcinoma may follow partial hysterectomy.

This complete removal of the internal genital organs may seem a great mutilation of the person of the patient, and it is; but the removal of a part or the whole of the uterus is nothing like so disastrous in its effect upon the vasomotor equilibrium of the woman as is the excision of the ovaries. It is the ovaries that furnish the internal secretion which influences the recurrence of menstruation, prepares the uterus for the advent of the possibly fertilized ovum, and with the secretion of the other internal ductless glands maintains a healthy equilibrium.

The governing principles of the conscientious physician should then be: (1) To save rather than to sacrifice. No organ should be removed where patience and judi-

cious treatment afford an opportunity for its retention and the restoration of the patient to good health. (2) Where sacrifice seems necessary, if the condition of the organs will permit the retention of any part or at least a part of one, it should be retained, for even if there is no longer an opportunity for procreation a portion of an ovary will permit the formation of the internal secretion, and prevent the annoying symptoms associated with premature ovarian pause. (3) Where both ovaries are diseased as to make the retention of any part of them dangerous to the health of the patient, the uterus showing evidences of extensive disease, the latter should be partially or entirely removed according to the condition of the cervix.

SERUM THERAPY.¹

BY RANDLE C. ROSENBERGER, M.D.,

Professor of Hygiene and Bacteriology, Jefferson Medical College, Philadelphia, Pa.

In bringing the subject of serum therapy before you, it is a singular fact that this is one branch of bacteriology that has really made great strides, not only as a method of cure, but also in relation to prophylaxis in disease.

At the present time there is a considerable number of infections in which serum therapy is concerned, and, naturally, serums resolve themselves into classification as to their use and method of administration.

We have antitoxic, antimicrobial, antimitic and antitoxic, medicated serum, autoserum, and homologous serums.

The methods of administration of the different serums vary as to what disease we are dealing with—from merely a subcutaneous injection to an intravenous, intraspinal, or intramuscular, and the apparatus used either an ordinary antitoxin syringe or inoculated by gravity. Local applications of serum (horse or human) have also been used in various maladies.

In the intraspinal method it has been recommended that attention be paid to the

blood-pressure and for symptoms of collapse, and when the blood-pressure falls below 10 mm. in adults and 5 mm. in children, fluid should be allowed to pass out by the spinal method.

In human pathology, the following diseases have been treated by one or more of the above types of serum: diphtheria, tetanus, cholera, dysentery, meningitis, influenza, meningococcic, pneumococcal pneumonia, undulant fever, anthrax, typhoid fever, gonorrhea, typhus fever, bubonic plague, hay-fever, and infectious diseases caused by streptococci, by staphylococci, and by other organisms. An antiserum for streptococcus infections should be polyvalent, as there are so many strains of streptococci in human pathology.

In animal pathology, experimental diseases as natural diseases, good results have been obtained in influenzal meningitis, B. anthracis infections, Asiatic cholera, bacillary dysentery, hog cholera, and anthrax.

The method of action of autoserum in the treatment and cure of diseases depends solely upon destruction of the infecting bacterium, but usually is the

¹Read before the Medical Society of the Philadelphia General Hospital, May 7, 1917.

of a combination of lysis with increased phagocytosis, due to simultaneous presence of bacteriotropins or immune opsonins. These conform more strongly to the theory of Metchnikoff regarding the relationship of bacteriolysins to leucocytic products and phagocytosis.

The question of anaphylaxis or hypersensitiveness to foreign serum or protein must always be borne in mind, and it is a good procedure where an antiserum is about to be administered to inquire if the patient is susceptible to what is known as cat asthma or horse asthma, brought about by the odor of these animals. I know a physician who, on coming into a laboratory where a few guinea-pigs are kept, is immediately seized with sneezing and coughing. In the case of susceptibility to horse asthma, or the condition brought about by the odor of the animal, another serum could be administered (ox, goat) which would not be attended by any untoward symptoms. Injection of a very minute quantity of the serum or protein intradermally can be performed and a reaction noticed in a very short time, so that if idiosyncrasy exists it can be guarded against.

Anaphylaxis to foreign serum or protein can be compared exactly to food idiosyncrasies, where individuals cannot partake of the simplest foods, such as eggs, certain meats, fish, berries, and many other foods, without suffering from some disturbance of the alimentary canal, or the skin.

This condition must not be confounded with serum disease, as this latter affection is the result of large doses of serum, and the symptoms come on after a week or ten days; whereas in anaphylaxis, symptoms occur almost immediately after an injection of antiserum.

The exact nature of anaphylactic shock is unknown, but it is thought to be the result of a ferment, and in experimental animals definite lesions, as ulcer of the stomach, emphysema, and hemorrhagic lesions in other organs, have been found.

The use of the antitoxin of tetanus at the present day is mostly as a prophylactic agent, inoculations being made into the

spinal canal, intravenously, subcutaneously, and intrathecal.

If a wound of entrance is found and inoculation of antitoxin be made around the wound, the disease is usually prevented, and if a little stiffness or tendency to stiffening sets in, another dose of antitoxin is given.

The prophylactic dose of tetanus antitoxin should be about 1500 units given subcutaneously, around the site of injury, and repeated in a few days. Here, again, the dose given may appear to some as too small, because as much as twenty to twenty-five thousand units have been given in single doses. It has even been suggested by some that antitoxin in the form of a powder, or the impregnation of a pad with the remedy, be applied to a wound where tetanus is feared.

Regarding the cure of tetanus with antitetanic serum, reports are very variable. In acute cases of tetanus the results as a rule are not very encouraging, while in slowly developing cases a much better prognosis and outcome is generally the rule. It appears that if no prophylactic dose of antitoxin is given the organism produces an amount of toxin which selectively attacks the nervous structures, anchors there and seemingly cannot be neutralized, and as a result death occurs. Therefore, in every instance where a wound is received as a result of friction, powder burn, a crush or laceration, antitetanic serum should be injected as a routine procedure, just as much so as antiseptics are used in cleansing a wound.

Regarding the antitoxin of diphtheria as a remedy in diphtheria, a great deal has been written and thousands of lives have been saved. Just as many more will be saved if the physician will act at once in all cases in which a membrane is seen, and inject antitoxin, even before a bacteriological diagnosis is arrived at. It seldom does harm, and, in many cases not necessarily due to the *B. diphtheriæ* (as in streptococcus and pneumococcus infections), the remedy has done good irrespective of the bacterium causing the infection.

We have heard of good results of the

action of diphtheria antitoxin in other severe diseases, such as noma and whooping-cough, but the number of these cases is so small that these favorable results cannot be taken as wholly consistent; nevertheless it should be given a trial.

Regarding the dose of the remedy, variance exists and perhaps always will exist, but I believe that where severe cases of the diseases are met large doses are demanded, and consequently recoveries will be many. It is regrettable that a certain number of practicing physicians at the present day still look upon diphtheria antitoxin with skepticism. Diphtheria is a disease so well known that it is most always easily recognized by the membrane. This latter structure may be located deep down in the trachea and not visible; or it may be of the transparent or hyaline variety, barely recognizable; or it may be in the nose. But where the toxic symptoms are pronounced, doubt should not exist for a moment as to the remedy to be used. Hesitate, and before one is aware the heart, the kidneys, and perhaps other viscera are saturated and acted upon by the toxin. Too late, antitoxin is administered, death occurs or paralysis develop; albuminuria and functional diseases of the heart may be brought about; and these conditions are blamed upon the antitoxin. There should be no hesitation where a membrane is seen, irrespective of its bacteriologic diagnosis, in the immediate recourse to antitoxin. There are no ill effects, except in the cases of hypersusceptibility to the serum or anaphylaxis.

Regarding the prophylactic use of diphtheria antitoxin, a great amount of this remedy can be saved, especially by institutions and schools, where a Schick reaction is performed. This test consists in the introduction subcutaneously of a very small sublethal dose of diphtheria toxin. If there is redness around the area in twenty-four hours, which persists for seven to ten days, the reaction is positive, indicating that the body is deficient in antitoxin and does not contain the normal amount (approximately $1/30$ of a unit to one Cc.). Where a negative reaction is obtained, which indicates

that the individual possesses the normal amount of antitoxin, no antitoxin is administered as a prophylactic (or a maintenance dose of antitoxin and toxin as advised by Park) and in this way a great saving of antitoxin is brought about. It has been recently worked out by Park of the New York Board of Health, that individuals who show a negative Schick reaction and remain protected for years and years of life. During an outbreak of diphtheria among children previously tested, it may be necessary to give antitoxin to those who give a positive reaction and children who could then continue without interruption. Occasionally a child giving a positive Schick test develops the disease, but this is exceptional.

Behring's method of immunization consists in inoculating the toxin with antitoxin, holding that the toxin when given in a properly regulated dose—being sure that the toxin does not contain a trace of the paralytic element of the toxin—is capable of stimulating the production of antitoxin. It has been claimed that the disease might arise from this inoculation in individuals who are carriers, but it has proved to be non-infectious in these individuals. Two injections should be given, the second one about ten days after the first dose. A single injection may produce only temporary protection. The theory is that the injection of this small dose of toxin stimulates the cells themselves would be stimulated to the production of antitoxin.

In cerebrospinal meningitis, the variability of the exudate in the spinal canal renders the injection of a fixed amount of fluid a dangerous procedure. When the flow is free, the fact is indicated by the escape of fluid every three to five seconds; the increased pressure which is characteristic in some cases is reduced to normal, and this is a dangerous sign. In some instances a change in blood-pressure is noticed, and in these cases fluid may be removed until the flow is diminished to the rate of one drop every three to five seconds.

By gravity method of administering antimeningococcic serum at least ten minutes should elapse in administering 10 cc. of serum. A total drop of 20 mm.

indicates that sufficient serum has been injected.

The antimeningococcus serum acts probably in three ways as a curative agent: first, as an antitoxic agent; second, as a bactericidal agent; and third, on the presence of bacteriotropins or immune bodies, which facilitates the phagocytosis of the meningococci. The mortality in this disease has very appreciably been diminished, and better results could no doubt be obtained if diagnosis is made early and serum introduced at once. Wherever a spinal puncture is performed and a cloudy fluid withdrawn, a dose of antimeningococcus serum (30 Cc.) should be given at once.

There is no doubt about the curative value of the serum if given early and frequently repeated—i.e., two or even three times a day, even though by spinal puncture only one-half or less of the amount of cerebrospinal fluid is obtained.

In a recent epidemic of 67 cases I have seen 30 Cc. of serum given where only 5 or 10 Cc. of fluid were withdrawn. In only a very few cases was injection of the serum observed with the blood-pressure, and in only one case was collapse noticed, and this occurred as a result of too rapid introduction of the serum.

In croupous pneumonia, serum treatment is not exactly new, but at the present time, owing to more accurate classification of the types of organisms causing the disease, better results from several standpoints have been obtained. According to Cole and his coworkers there are different types of pneumococci, and for several varieties or groups of these organisms a serum has been obtained.

Pneumococci are thus divided into four groups. In group one are included all the races against which serum one (a horse serum obtained by inoculating with a pneumococcus) is effective; in group two are included all those against which serum two is effective; in group three, those of the pneumococcus mucosus group; and the fourth group includes all types or strains against which serums one and two are not effective and which do not belong to the mucosus group. The organisms of group

three differ from the others in that the serum of immunized animals possesses no protective power, and it induces active but not passive immunity. Further, it has no agglutinating power, unless the capsule of the organism is removed by treating with dilute hydrochloric acid and exposing the organism to 80° C. for fifty minutes. This serum which agglutinated the altered organisms failed to agglutinate the organisms of group one and two.

In the case of a group organism having been isolated from a case of pneumonia, this type persists throughout the course of the disease. It is possible, according to Cole, that the prevalence of cases due to the various types varies from year to year and in different places, which may explain the variation in mortality observed in different times and places. The lowest mortality has been due to the organisms of type four.

To employ a serum effectively it is necessary to quickly determine the type of organism concerned. This is done by either puncturing a lung and obtaining a culture, or by injecting the washed sputum into the peritoneal cavity of a mouse, and after five or six hours washing the peritoneal cavity out with salt solution and centrifugalizing. This method threw the cells down and left a suspension of the organisms. This suspension was used for the agglutination test, and if the organism fails to agglutinate with types one and two it is useless to undertake serum treatment.

Previously only 10 to 20 Cc. of serum were used in the treatment of the disease, but Cole uses anywhere from 50 to 100 Cc. of serum (diluted one-half with salt solution) intravenously, after having previously given a dose of 0.5 Cc. of serum subcutaneously to determine hypersensitiveness. The dose was repeated not oftener than every twelve hours, some receiving 190 to 460 Cc. of serum, and one receiving 700 Cc. Of more than thirty cases due to group one all recovered but one, while of group two, eight cases were treated and two died. As usual, treatment should be instituted as early as possible. In all the cases except the fatal ones, the serum has had an ultimate favorable effect in lowering the

temperature and shortening the course of the disease, apparently lessening the degree of intoxication, and there was practically no extension of the involved area where treatment was commenced early.

It also appears that one inoculation of the serum will cause the organisms to disappear from the circulation, or, if not present or demonstrable in the blood, it prevents invasion by the organism. It is possible that the serum is mostly antibacterial, though experimental work has indicated that it may possess some antitoxic effect. Personally it is a question whether a polyvalent serum would not have as good effect as the specific type serum.

It has been proved that the serum of a syphilitic patient obtained after a dose of salvarsan possesses bactericidal or spirocheticidal action.

As a consequence, some cases of locomotor ataxia, paresis, and other syphilitic infections of the central nervous system under this serum treatment may show great improvement.

It should be used of course as early as possible in syphilitic conditions of the cord, as injection of the serum will not prove of any benefit where tissue has been actually destroyed.

It should also be recommended as an adjuvant to the intravenous injection of salvarsan, as it is our idea to obtain an intensive action upon the *treponema pallidum*.

The only necessary preparation of the serum is to obtain the blood anywhere from thirty minutes to an hour after the injection of the drug (salvarsan or neosalvarsan), separate the serum and heat the latter to 56° C. for one-half hour, then inject with admixture with sterile salt solution or undiluted. The dose of serum is usually the amount of fluid withdrawn, whether this be a few Cc. or as much as 30 to 50 Cc. Mercurialized serum has also been recommended in the same way as salvarsanized serum.

In snake venom it has been found that there are two bodies at fault—toxins—one being largely neurotoxic and producing paralysis of the respiratory centers, and the

other being hemotoxic, an irritant, and causing local necrosis of tissues and hemorrhage.

According to Calmette and Fournier, antivenom has been obtained by injecting the horse with cobra venom, heated to 56° C. for an hour. The serum obtained from such an immunized horse is found to neutralize the toxic phenomena, but does not relieve the local irritant action of the bite.

An antiserum has also been obtained from horses immunized against ragwort, a golden-rod which has been used in the treatment of autumnal catarrh, or hemorrhoids. Here it must be remembered that pollen grains act as excitors of the mucous membrane, hence until a polyvalent serum is obtained, uniform results, either as cure or prophylaxis, will not be obtained.

Blood serum from the renal vein of a goat, dog, or sheep has been recommended in cases of acute and chronic nephritis, for the reason that it is thought that the blood from this region contains some of the internal secretion of the kidney, which acts favorably upon the kidneys and other organs in general.

Normal human blood serum, and horse serum, has been recommended in some of the chronic persistent skin diseases attended by itching, such as pruritus in pregnancy, urticaria, malignant pruritus, and senile pruritus, and forms of eczema. Bed-sores, ulcers, even gangrenous ulcers, have been treated with horse serum or human serum or ascitic fluid with more or less success by the simple application of these fluids. Icterus neonatorum and purpura hemorrhagica have been treated with whole blood.

In tuberculous and non-tuberculous effusions into the serous membranes, various serums have been used, but with little or no if any beneficial results.

It must not be forgotten that antivenom have been tried in diseases such as smallpox, leprosy, erysipelas, and gonorrhea, arthritis, but with results that are not conclusive.

In scarlet fever, several observations have demonstrated the value of injecting blood serum of convalescents, in

cases of the disease, where restlessness, delirium, and evidences of heart failure are present.

A mixed serum can be used—that is, from several donors or from a single donor. Usually the blood is obtained from a donor on the eighteenth to the twenty-fourth day of their disease, and a Wassermann test previously made. Apart from the blood serum, the whole blood can be administered, and these injections are made intravenously in the case of serum in the dose of 50 Cc. for children and 100 Cc. for adults.

In the administration of the whole blood intramuscular injections are recommended. The groups of muscles usually chosen are the gluteal muscles, the outer regions of the thighs, the calves, and the triceps muscles. Thirty Cc. was the dose usually given, while some received as much as 250 Cc. Normal horse serum seemed entirely without any effect, while blood serum from an ordinarily healthy individual has exerted some beneficial effect, but not as markedly as from the scarlet fever convalescent.

Of late a great amount of work has been done in the treatment of anterior poliomyelitis with the blood serum of convalescents and also with horse serum.

Regarding the action of the serum, it was found that both the immune serum and horse serum brought about a markedly increased cellular content of the spinal fluid in acute cases.

Polynuclear leucocytes were found to predominate, but no bacteria were demonstrable.

Regarding the curative effect of the immune serum, it appears that if the patient is treated in the preparalytic stage paralyses are few or do not occur.

In the paralytic cases it is claimed that there is improvement in the paralyses, while in the bulbar cases very little improvement if any occurred.

Further observations and experiments on animals (monkeys) will have to be undertaken before the serum treatment will be sufficiently understood to be used as the specific treatment of this disease.

THE CARE OF FOCAL INFECTION FROM THE DENTAL STANDPOINT.¹

BY THEODORE D. CASTO, D.D.S.,

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The teeth and the alveolar process are transitory tissues. They are end organs; therefore they are the first to receive the influence of any toxemia or the impress of age.

The alveolar process of each superior maxilla includes the tuberosity, and extends as far forward as the median line of the bone, where it articulates with the process upon the opposite side. It is narrow in front, and gradually enlarges until it reaches the tuberosity, where it becomes rounded. The process is composed of two plates of bones, an outer and an inner, which are united at intervals by septa of cancellous tissue. These form the alveoli for the reception of the roots of the teeth. In some cases the buccal and labial surfaces of the roots of healthy teeth extend nearly or

quite through the outer bony plate and are covered by the peridental and mucous membranes only.

The growth and the stability of the teeth depend upon the thickness and the strength of the alveolar process. Our ancestors of Southern and Central Europe are dark-complexioned and have wide dental arches, in which we find some of the most capable teeth. On the contrary our light-haired cousins of the North have a narrow arch, the alveolar arch tapering down to a very thin plate.

This alveolar border is the trellis that supports the gum at the gingival border of the tooth. When halisteresis occurs through this bony margin, then we have the so-called recession of the gums. This recession of the gums follows the recession of the bone and does not take place until after the bone has receded; this more often occurs in our

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light-haired patients, and because of the thinness of this tissue and the poor circulation supplied to the gingival border depletes it in such a way that it readily absorbs toxins, causing slight signs of inflammation, followed by soreness of the gum margin and a decided congestion which determines the tendency to hemorrhage. The bacteria often at this period penetrate well into the bony tissue, causing its loss, and when this breaks down it fills with pus, which terminates into a local or general pyorrhea alveolaris.

If the circulation of these end organs could be kept near normal we would have no interstitial gingivitis and thus no pyorrhea alveolaris. The mucous membrane of the mouth and the pericemental membrane of the tooth roots should form a beautiful festoon around the gingival margin.

The deciduous teeth are twenty-four in number and are erupted from the sixth to the twenty-fourth months. The permanent teeth are erupted from the sixth year to the fourteenth year, except the third molar (wisdom), which has no definite time to appear, but is really scheduled as coming from the seventeenth to the twenty-fifth year, although there are some cases of their erupting after fifty years.

The deciduous teeth are often badly broken down by caries by the third or the fifth year. The pulp being freely exposed becomes infected and thus carries bacteria to the adjoining tissues. Their roots are absorbed early, and such infections do not usually cause any deep bone trouble and are often passed over very lightly, as no one, at least the parents, are deeply concerned by the things that happen to the first teeth as they are to be replaced in a few years.

These infections cause a slight swelling, and the tissue being thin and vascular an abscess is readily formed, followed very soon by a fistula which continues to drain into the mouth and at other times is closed, and is thus thrown into the circulation, there to work whatever ravages to the general system the character of these bacteria may cause. The great hazard in the young patient is the small amount of pain and lack

of attention by nurse or parent. deciduous teeth decay very rapidly, often form very sharp projections, cause abrasions of the tongue and cheeks, subjecting these organs to the mouth bacteria. These abrasions are a great inconvenience to our small patient who is often so young and his experience is limited that he cannot tell us of his troubles. These rough teeth were brought to my attention very forcibly more than twenty years ago when I was trying to fill and straighten the teeth for the Children's Bureau. A child of eight or nine years was brought to me who had just passed four weeks in hospital for stomatitis. The whole trouble had arisen from these very sharp edges of some very badly broken-down deciduous molars, and the cause of the trouble was soon corrected by the use of forceps and polishing wheels. How much valuable time and needless expense to the Society and the State had been wasted! This was twenty years before we had thought of the importance of the interne as having any place on the hospital staff.

You may be interested to know how we treat these teeth at the Mt. Sinai Hospital Clinic, which has treated nearly nine hundred cases in the last year. This clinic has been greatly helped by the mutual cooperation from the very worthy chief and his excellent staff. It has been a delightful work with a body of men who have contributed in every way so willingly to the success of our special clinic.

Always before doing anything that might abrade or break the mucous membrane of the mouth, the tissues surrounding the teeth are painted with a solution of zinc-iodine in glycerin; then these angles are made as smooth and rounding as possible. The smooth surface that can be retained. The cavities in the teeth are made free from sharp angles or overhanging walls. Then the cavities in the deciduous teeth are painted with silver nitrate, from two to four per cent, which oxidizes and turns the dentin to a beautiful black and really prevents further decay. The abscessed teeth are often made useful by opening up the abscess and placing a pellet of cotton with cr

in it, and following this at the next visit with a treatment of silver nitrate.

If these teeth can be saved for eight or nine months, this gives time for the first molar to erupt and take up its work of mastication. Two or three cases have been presented in this clinic in which no molar occlusion could be established, and hence the sad consequence of a patient trying to masticate on six or eight incisors and a temporary cuspid.

When we look into the mouths of the juvenile patients passing through these corridors and see the awful ravages of a dental caries and alveolar abscess, we feel that we should have more dental chairs and forty men on the staff instead of eight or twelve. I cannot refrain from calling your attention to the work that might be done in regulating teeth and thus giving the bones of the face space to develop, so that the air space of the maxilla and ethmoids would respond to the treatment of the nose and throat specialist.

About eight or ten years ago William Hunter of England made a very severe criticism of the dentists, accusing them of making ill-fitting crowns and bridges which gave field for infectious bacteria. This made us take stock of the things that we had been doing and of the possible results, and the excellent researches of Rosenow, Billings and Hartzell; although some of their conclusions seemed extravagant, we are beginning to believe in them. These men claim that 95 per cent of pulpless teeth show foci of infection, but this has not been my experience. The condition of rarefied bone around the apex of vital teeth is really frequent. Others have made the assertion that where teeth have been treated and an attempted canal filling placed they have more frequently presented signs of apical infection than teeth which were broken down and not treated. This has not been our experience in this clinic, where we see many radiolucent areas around roots that have never been treated. The truth is that these specialists are not seeing the average case as it appears in an ordinary dental practice, but they are examining selective cases passed to them for consultation from many private dental offices and public

clinics; therefore their experience is not the common experience, and when they speak of 95 per cent of pulpless teeth as being a menace to their host they really mean 95 per cent of the 1 per cent, because they are only examining about 1 per cent of the average dental cases.

The temporary teeth are replaced by the second dentition, and this is completed by the fourteenth year. These teeth are subject to rapid decay until the twenty-fifth year, but often from the seventh to the ninth year we find cavities in the six-year molar. The pulp is often exposed, forming an easy ingress to the general circulation of the numerous bacteria of the mouth. There is no means of destroying the oral flora, so we must interest ourselves as dentists in filling these teeth before the cavities have become of such a character as to permit these infectious bacteria to enter the circulation through the root canals.

When this has not been done the foci have been formed and the roentgenogram shows an area of radiolucens at the apex of the tooth. This is where the work of the physician and the dentist is closely related.

Here we find in these apical areas many forms of streptococcus. *Streptococcus py. aureus*, *streptococcus viridans*, *staphylococcus py. aureus*, *pneumococcus*, and *diplococcus* have all been isolated in this clinic from cultures of seventeen cases in which we found the following: *Staphylococcus* 8, *streptococcus* 21, *staphyl. py. aureus* 13, *staphyl. py. albus* 9, *pneumococcus* 13, *micro. catarrhalis* 18, *B. pseudo dip.* 8, *B. fusiformis* 4, *strept. viridans* 3, *leptothrix* 2, *capsulatus* 1, *B. subtilis* 2, yeast cells 2, *diplococcus* 1.

These are a few of the cases examined by the bacteriologist, Dr. A. I. Rubenstone:

CHILD OF FIVE YEARS.

Aerobic: *Staphyl. py. aureus*.
Micro. catarrhalis.
Pneumococcus.

AGED 32.

Aerobic: *Bacillus fusiformis*.
Leptothrix.
Pneumococcus.

Aerobic: *Staphyl. py. aureus*.
Micro. catarrhalis.
Streptococcus.

Anaerobic: Staph. and strepto.
B. fusiformis.
Staphyl. py. aureus.

Aerobic: Strepto. viridans.
Leptothrix.
B. capsulatus.

Tooth culture: Micro. catarrhalis.
Streptococcus.

Aerobic: Staphylococcus.
Pneumococcus.

Anaerobic: Staphylococcus.
Streptococcus.
Pneumococcus.
Staphyl. py. aureus.
B. pseudo diphtheriæ.
Micro. catarrhalis.

Aerobic: Staphyl. py. aureus.
B. subtilis.
Pneumococcus.

Anaerobic: Same.
Yeast cells present in tooth culture.

CHILD, AGED 4.

Aerobic: Micro. catarrhalis.
Staphylococcus.
Streptococcus.
Pneumococcus.

Anaerobic: Micro. catarrhalis.
Staphylococcus.
Streptococcus.

AGED 52.

Aerobic: Staphylococcus.
Streptococcus.
Micro. catarrhalis.

CHILD, AGED 7.

Staphyl. py. albus.
Streptococcus.
Micro. catarrhalis.

HEART CASE.

Aerobic: Staphyl. py. albus.
Staphyl. py. albus.

Anaerobic: Staphyl. (short).

HEART CASE—PYORRHEA.

Aerobic: Staphyl. py. aureus.
Micro. catarrhalis.
Streptococcus.

CASE OF PYORRHEA, AGED 65.

Aerobic: B. pseudo dip.
Micro. catarrhalis.

Anaerobic: Staphyl. py. aureus.
B. pseudo dip.

RHEUMATIC CASE, AGED 25.

Had a severe case of gingivitis and
an abscess of two upper bicuspids.

Aerobic: Staphyl. py. aureus.
Micro. catarrhalis.
B. pseudo dip.

Anaerobic: Staphyl. py. aureus.
B. pseudo dip.
Pneumococcus.

FOURTEEN TEETH EXTRACTED.

Aerobic: Staphyl. py. aureus.
Streptococcus.
Micro. catarrhalis.
B. pseudo dip.

HEART CASE.

Anaerobic: Strept. viridans.
Staphyl. albus.

Aerobic: Streptococcus.
Pneumococcus.
B. pseudo dip.

RHEUMATIC CASE.

Micro. catarrhalis.
B. fusiformis.
Staphyl. py. albus.

Anaerobic: Staphyl. py. albus.
Diplococci.
Streptococcus.
B. fusiformis.

Also had a severe case of
inflammation of mouth and pharynx.

Anaerobic: Pneumococcus.
B. pseudo dip.

Aerobic: Strept. viridans.
Staphylococcus.
Pneumococcus.
Strept. brevic.
Staphyl. py. albus.

These cultures were all made from infected abscesses of teeth extracted from the ward and from the ambulatory part of our dental clinics. It would be futile to try to recite the injury that may be done to our patients from these foci of infection if you are all familiar with the game of hide-and-seek that may follow the entry of these bacteria into the circulation, and since their facultative disposition as well as their selective disposition for growth on certain media to eliminate their entry into the system has been very much quickened.

Perhaps relating an instance of pyorrhea in which recovery has been brought about would not be amiss. One boy of ten had been in the hospital for three days, running a high temperature, with symptoms of rheumatism. The radiograph showed a rarefied area around the upper left first bicuspid. This tooth was extracted, and we found it to have had two pieces of wooden toothpicks driven into each canal and into the tissue. This made a hasty and uneventful recovery. Another case was a man of twenty-two years showing symptoms of general debility, weakness of muscles and joints. Radiographs showed an impacted root of a cuspid tooth in the area of rarefied bone, including the root of the incisor region and well into the alveolar process. The teeth were extracted and the patient was kept in the hospital under the care of the interne for five days, and he has since had a very good recovery. A Wassermann test was found negative. No smears or cultures were made.

The question is, what are we going to do with the pyorrhea pocket and the apical abscess? All the amebicides and vaccines that can be delivered will never benefit our patient as long as these things remain around the apex of the teeth.

One coterie of dentists are still relying on emetine, others are treating septic canals by ionization, zinc, or sodium chloride in the root canals, and some are recommending the amputation of the roots of the diseased teeth.

What do we recommend at this clinic? We try to have cultures made from all mouths showing any systemic infection. These cultures are taken from pus pockets or from the alveoli of the extracted teeth. If any of you should consult us we would advise an autogenous vaccine made from these cultures where they show streptococcus, staphylococcus, or diplococcus infections, in the hope that this might help to clear up the general condition. This could only be accomplished by the most careful attention from the internes. Wassermann tests should be made, blood counts taken every three days, and a close clinical chart should be kept.

While the mouth shows a severe case of stomatitis we can only recommend polishing four or six teeth a day, as it has been observed that even this work brings about an autoinfection. That is what I believe takes place, as the patient will have a marked rise in temperature.

Root amputation has its place as a means of restoring teeth to usefulness, but as a means of restoring a patient to health I am very much in doubt; although sometimes I do remove a root when it has been exposed by an abscess and when the tooth is of great service to mastication. This operation is suggested often in the upper third molars, when the infected areas are around one root and when the root is dissected at the bifurcation, thus removing the entire root and establishing free drainage.

HISTORY OF THREE CASES.

Case 1.—Patient, thirty-five years old; referred by his physician. Knees were stiff; soreness in his back. The pictures

indicate an abscess on the upper right first molar and the lower left first molar. In the left central incisor region the pictures show a root that has been amputated for eight years. This root is carrying a pin which was supporting a plate. Although this incisor root had carried a plate for years, there were no evident signs in this radiograph that it has been long infected, as there is an area of rarefied bone all around this piece of tooth, and when it was extracted it showed that disease had destroyed all the periodontal membrane and that the



CASE 1.

piece of tooth was really a foreign body just as a piece of metal or ivory would be.

The statement that I wish to make is that, although this root furnished the function performed by the tooth it has never been a good thing for the patient's health. This root and the molars were extracted. Cultures were made from all the sockets and showed diplococcus. The autogenous vaccine was made, and the patient is receiving the regular dosage every five days, to which he seems to respond very favorably.

Case 2.—These pictures (Mrs. A.) are given to show how and when root amputation may be of use. The granuloma at the end of this tooth came out when the tooth

was extracted. This root is well supplied by periodontal membrane in its upper half, and apical resistance might have given us very fair results, but how are we to know even from the best pictures just how far these bacteria have penetrated the membrane?

I must conclude that even if teeth may be made useful through root amputation, the patient's health demands the extraction



CASE 2.—Before extraction.

where areas of this kind are shown. They should always be extracted when the patient shows systemic symptoms that are not readily traced to some cause. How futile it is to have blood counts made and vaccines delivered and leave such centers as are shown around these teeth to reinfect our patient. You could not persuade me that any tooth is worth enough as a masticatory organ to balance its chance as a source of general infection.

I must condemn the use of ill-fitting crowns and bridges, because these conditions in the mouth are ideal for the development of bacteria. Food, moisture, and correct temperature always being present demand that all these pockets and rough places should be removed, so that the saliva can wash all parts of the teeth, and the tongue and muscles may use their mechanical force in cleansing the mouth.

Case 3.—This girl of fourteen had a fall

when she was nine years old which knocked off a small corner from the left lateral incisor. When she was twelve years old, or on July 4, 1915, she had a fall, which terminated in an abscess of the symphysis of the mandible. This abscess developed into a fistula, which would close and then open at uncertain intervals. In October of 1915 the right lower first molar, which had been attached, became swollen, and was extracted. The patient was assured that this extraction would cure the fistula. In July, 1916, an operation on the chin was advised by the family physician, which was done by a surgeon in one of the West Philadelphia hospitals on January 6, 1917, the patient being retained in the hospital for three weeks. This operation was followed by treatment by the family physician until February, when the patient was discharged. On March 4 the fistula again opened,



CASE 3.

this time the left first molar was extracted, and diagnosed as root caries. The patient came to my office on April 6, 1917, when she diagnosed the entire trouble as coming from the broken incisor, which I opened and found a putrescent pulp. There had been any pus discharged since the treatment on the 10th of April, and the marks of the fistula have nearly disappeared.

EDITORIAL.

HEART FAILURE TREATED BY MASSAGE OF THE HEART.

The readers of the THERAPEUTIC GAZETTE will recall that on a previous occasion we drew attention to this subject and pointed out that the term massage of the heart was applied to several widely different procedures. Some have applied it to massage or kneading of the precordium, with probably no direct effect upon the heart, but only a reflex irritation. Others have practiced so-called massage of the heart through the diaphragm during the performance of an abdominal operation when cardiac arrest was threatened, and still others have gone so far, in desperate cases, as to incise the diaphragm, pass the hand through the opening, and directly massage the heart. In the cases to which we referred in an earlier editorial there seemed to be no question that such measures served to restore cardiac action. Whether the more radical method last cited is not so grave as to be virtually death-dealing in itself is a question for debate, although reports show that, temporarily at least, the action of the heart is reestablished or improved.

For these reasons we have noted with interest an article by Molyneux in the *British Medical Journal* of March 31, 1917, in which he emphasized the interest which has been taken of late in heart massage, when the massage was applied through the diaphragm in a patient undergoing operation. He is also familiar with the fact that, when the patient has collapsed on the operating table and has failed to respond to the ordinary stimuli, massage through the diaphragm has been practiced with advantage. He advocates, however, not permitting undue delay, thinking that desperate conditions should be met by desperate measures, and he is so confident of the value of the method that he even discusses its employment in collapse complicating operation for adenoids. Recognizing that the surgeon's

hands are not sterile and that he might not have suitable instruments at hand for abdominal section, he nevertheless urges that delay may mean the loss of life and that the chance is worth taking.

He states that every case of death on the operating table that has come to his knowledge has been one in which chloroform has been employed, and that it is very rare to hear of a death under ether, an observation which is in accord with that of the entire profession, and which is the more interesting since in chloroform poisoning the heart is often widely distended and fibrillating, and therefore can be reasonably expected to reestablish its contractions if by gentle compression its cavities can be emptied.

The cases cited by Molyneux are as follows:

A woman of sixty-three was sufficiently optimistic to believe that the enlargement of her abdomen might mean her first pregnancy, but the examination showed an ovarian tumor of great size impeding respiration. Indeed, Molyneux describes the patient as a shell surrounding a tumor, so large was the growth. The pulse was irregular, the arteries thickened, and there was a marked aortic systolic murmur. On opening the abdomen the tumor was removed, after having been aspirated, and the patient immediately collapsed, the respiration and heart both stopping. Artificial respiration and pituitary extract were without effect. The right hand was introduced into the abdominal incision, the left hand placed over the heart, and the heart massaged by a series of rhythmic squeezes at the rate of forty or fifty a minute, the right hand pressing the heart through the diaphragm against the chest wall, this being reinforced by pressure on the outside of the chest by the left hand. Molyneux states that after a short time the heart commenced to beat, circulation was restored, and the patient made a rapid recovery. Notwithstanding

his previous observation in regard to the danger of chloroform, ether was the anesthetic in this case. He believes, and probably correctly, that the collapse was due to sudden relief of intra-abdominal pressure, the tumor being so large that it took two people to lift it off the table.

His second case was that of a man with appendicitis, whose age is not given. As soon as the abdomen was opened collapse occurred. The incision was rapidly enlarged, and the right hand introduced to the diaphragm and the heart felt as an absolutely flabby organ without contraction. Massage of the heart and artificial respiration were at once commenced. After about one minute the massage was stopped, but the heart had not started. It was renewed, and the heart, at the end of the second minute, began to beat feebly. Pituitary extract and strychnine were injected, and after about five minutes the patient's condition improved so much that it was decided to complete the operation, as the appendix was distended with pus. The patient survived the operation, was sustained by continuous enteroclysis of normal saline containing adrenalin, and made a good recovery. In this case the anesthetic used was a mixture of chloroform and ether before the collapse and ether subsequently.

Further information in regard to this matter is given us in a report made by Mollison in the *British Journal of Children's Diseases* for January to March, 1917. Mollison is Surgeon to the Ear and Throat Department of Guy's Hospital, London, and reports the case of a boy of six years, slightly built, but healthy in appearance, who had a history of having had on a previous occasion bronchitis and asthma, and from whom it was considered desirable to remove the tonsils and adenoids. They prepared him in the usual way for an anesthetic, a purge being given on the day before the operation and a cup of milk at 8 A.M. on the morning of the operation. A mixture of chloroform, two parts, and ether, three parts, was administered on an open mask. The patient passed speedily into uncon-

sciousness and the corneal reflex was lost. The left tonsil was removed successfully, but while the right was being removed the boy struggled slightly. He was turned on the side and the adenoid removed. The boy did not react properly. The heart was found to be flaccid, respiration stopped, the pupils were dilated, and the corneal reflexes absent. The head was lowered, the throat cleared, the tongue pulled forward, and artificial respiration by Sylvester's method instituted. Although the air entered the chest quite freely, the patient's breathing did not persist. Stimulants were administered. Hot cloths were applied to the chest and abdomen, brandy and ether were injected subcutaneously, 0.5 Cc. of pituitrin injected subcutaneously, and another 0.5 Cc. of pituitrin was injected through the chest-wall into the heart. No response followed. No heart sounds could be heard. The abdominal walls were washed with ether and an incision four inches long was made through the ensiform cartilage to just above the umbilicus in the middle line, but there was no bleeding from the sides of the incision. The liver, which was incidentally cut, failed to bleed. The right hand was introduced into the belly to feel the heart, with no tremor or movement. With the left hand on the chest-wall and the fingers of the right hand behind the heart, pressure was exerted until the rate of about ninety times per minute. At some moments respiratory movements began and continued intermittently. The boy's color improved and his pupils contracted, but there was no attempt at heart contraction. After a time the operator became tired, and an assistant continued to massage the heart, Mollison injecting nearly 1 Cc. of pituitrin into the heart, guiding the needle through the chest-wall between the fingers of the right hand.

Massage was now renewed, and after about twenty more squeezes the heart suddenly began beating strongly. As it was certain that the heart was beating well, the liver was sutured and the abdominal incision closed. It was estimated that the heart had

beating fifteen or twenty minutes before its action was reestablished. The whole incident lasted from 1 P.M., when the operation began, until 1:35 P.M., when the boy was returned to the ward. On his return to the ward saline infusions were given and the foot of the bed raised considerably. An hour later the patient became restless, his limbs were rigid, with choreic movements, and the intestines escaped from the wound, requiring their replacing and new suturing. The boy remained more or less unconscious for a period of seven days, and for some days had a meningitic cry, which on one occasion was almost continuous for thirty-six hours; he nevertheless finally began to improve, and seventeen days after the operation he could sit up, but still had incontinence of urine. He eventually made a perfect recovery and left the hospital about six weeks after the operation.

Mollison adds to his article the records of fourteen cases, which are summarized in the following table:

	Name of operator.	Anesthetic.	Time of ordinary methods.	Time taken to restore heart.	Method.	Operation being performed.
1.	Iglerud.....	?	3-4 min.	1 min.	Resection of ribs and opening pericardium.	Abdominal.
2.	Lane.....	Ether.	2-3 min.	1 or 2 squeezes.	Subdiaphragmatic.	Ditto.
3.	Gray.....	?	?	2 or 3 squeezes.	Ditto.	Ditto.
4.	Cohen.....	CHCl ₃ .	2 min.	1 min.	Ditto.	Ditto.
5.	Crisle.....	Ether.	Nil.	5-6 min.	Rubber suit method.	Exophthalmic goitre.
6.	Sencert.....	CHCl ₃ .	7-8 min.	5 min.	Subdiaphragmatic.	Abdominal.
7.	Conkling.....	Ether.	2 min.	1 min.	Through chest wall.	Region of chest wall.
8.	Smith.....	CHCl ₃ .	8 min.	1 min.	Subdiaphragmatic.	Examination of rectum.
9.	Ramsay.....	CHCl ₃ and ether.	4 min.	1 min.	Ditto.	For prolapse of uterus,
10.	Rutherford.....	CHCl ₃ .	1-2 min.	12 squeezes.	Ditto.	Whitehead's operation.
11.	Milne.....	CHCl ₃ .	2 min.?	1 squeeze.	Ditto.	Operation not begun.
12.	Sichell.....	C.E. and ether.	1 min.?	"A short time."	Ditto.	Ditto.
13.	Frazier.....	Ether, then CHCl ₃ .	1-2 min. or less.	2 min.	Ditto.	Hydrocele just begun.
14.	Mollison.....	C.E.	18 min.	4 min.?	Ditto.	Removal of tonsils and adenoids.

The first nine cases were quoted by Green (*Lancet*, 1906, ii, p. 1706). Only in case 9 is any note made of after-effects; in this case the patient slept for four hours and was at times delirious. She was better the next day.

As we said in a previous article dealing with this matter, it requires a considerable amount of bravery and decision for the surgeon to resort to direct heart massage. The fact, however, that there are case reports accumulating to show that it apparently saves life is worthy of remembrance when death seems imminent in the course of abdominal and other operations.

CEREBRAL SYMPTOMS AFTER NASAL OPERATIONS.

In much the same way in which a crusade against the tonsils was instituted some years ago operations upon the nasal septum have become increasingly popular and, undoubtedly, in many instances have given much relief from obstruction to normal breathing, or, what is more important, relief from obstruction to normal drainage from the various cavities in the bony structures of the face. It was said a number of years ago by Maurice Richardson of Boston that unless a good surgeon could be obtained in a given case of appendicitis it was probably better to treat a patient medically than to subject him to operation, and this statement holds with even greater force in regard to operations of a radical character either upon the nasal septum or the turbinate bodies: first, because serious damage can be done by an unskilled operator; and secondly, because

such operations are not to be entered into lightly, owing to the fact that meningeal and cerebral manifestations of greater or less severity most commonly complicate convalescence. Of course, in many instances such operations are absolutely essential, not only for the purpose of relieving disagreeable symptoms, but also to prevent the meningeal and cerebral com-

plications which otherwise inevitably ensue. The point which we wish to make here is that these operations are not simple ones, either in their immediate or remote effects.

In connection with this matter we have read with interest a communication made to the *Journal of Laryngology, Rhinology, and Otology*, of London, by St. Clair Thomson, who is well known as one of the leading rhinologists in the United Kingdom. In this article he remarks that every rhinologist has had anxieties after operations in the nose, and that any decided rise of temperature, or any perversion of the patient's mentality, leads one to prepare for the worst, particularly if the operation has been done in the presence of any markedly pyogenic condition, such as sinus suppuration, when the slightest disturbance of progress in the first three days is only too apt to usher in a catastrophe. On the other hand, when the nasal disease is not markedly purulent the symptoms may be alarming and still not fatal. Thomson then proceeds to record a case of epithelioma of the left ethmoid and maxillary sinus. Nothing untoward happened during the operation, but on the next day the patient was markedly and alarmingly changed. Instead of being bright and vivacious, she was dull, inattentive, and restless. Her speech was hesitating and indistinct. Her temperature was 101.2° to 103.6° and pulse-rate 120. There were no localizing symptoms, but there was fear that meningeal infection had taken place through the sheaths of the olfactory nerve. Careful ophthalmoscopic examination led to the belief that she was undoubtedly suffering from cerebral irritation with some compression, probably due to some exudate of an edematous nature. Twenty-four hours later the patient was improved, and on the third day the temperature was normal and the cerebral symptoms had largely disappeared.

He also reports the case of a lad, which the thought of makes him shudder, for he realized that his nasal forceps were meddling in the anterior fossa of the skull,

and yet no new symptoms were manifested. In another case there was a nasal disease of the ethmoid. In both cases there was no curetting, but after plucking out a mass of growth he realized that the disease had eroded the cribriform plate, so that his instrument was against the brain matter. These two cases seemed indeed more prone to be followed by evil results than the first, and the variations presented served only to illustrate that one cannot tell exactly the type of case most prone to complications. Thomson therefore concludes that the cribriform plate must be a danger zone because the dura mater is never prepared to help in rectifying a sudden slip in this area as it does elsewhere, throwing up defensive breastworks on the inner side of the temporal bone, by thickening and strengthening the dura mater when the latter is slowly invaded by a malignant growth.

THE RELATIONSHIP OF INTERSTENTIAL DISORDERS TO EPILEPTIC SEIZURES.

It is a well-recognized fact that the disease is difficult to treat and its etiology is difficult to determine a multitude of remedies are suggested for its relief, and an even larger number of theories have been brought forward to explain its origin. It is probably true that no disease known to man has been treated in as many different ways as epilepsy, and the number of causes which have been assigned to it are innumerable.

Curiously enough some of the theories which a few years ago were considered ancient as to be hoary with age have recently been rejuvenated in a more modern form. A favorite explanation for the conditions, to wit, that a given state of the body, such as intestinal intoxication, has found its earnest advocates, and at least one physiologist has actually gone so far as to express the belief that the large intestine of the epileptic is the home of the microörganism which may be specifically responsible in a given case

convulsive outbreak, and, going a step further, has advocated and performed a radical abdominal operation to produce a cure.

All diseases of the nervous system which are largely connected with altered function are prone to be changed, at least for a time in their manifestations, by strain and shock, and cases of epilepsy subjected to severe operations, whether they be in the field of abdominal surgery or, as was so popular twenty or thirty years ago, in the field of cerebral surgery, are not rarely followed, if the patient survives, by a period in which the convulsive seizures are temporarily put aside. In the case of so-called idiopathic epilepsy, the causes which have so far been discovered are those which upset the balance of nerve cells already unstable, rather than the underlying or deep-seated causes of the disease itself.

In the *Boston Medical and Surgical Journal* of May 17, 1917, Caro makes a report from the Pathological Laboratory of the Monson State Hospital for Epileptics at Palmer, Mass., on the "Incidence of Intestinal Adhesions as a Factor in Chronic Intestinal Stasis in the Epileptics." He well points out that the trend of recent research has been directed in large part away from the brain structure and toward the gastrointestinal tract and the glands of internal secretion, and the fact that constipation is so common amongst epileptics has possibly been the finger which pointed toward this change of view. Caro, therefore, to determine if there was a high percentage in relationship between intestinal adhesions and epilepsy, utilized two hundred and fifty post-mortem examinations for this purpose. He divides his cases into two groups, those in which adhesions may be considered a factor in the causation of chronic intestinal stasis, and those in which adhesions have resulted from chronic intestinal stasis. Two hundred and twelve of the autopsies failed to reveal any adhesions, and therefore it would seem evident that adhesions cannot be a very common cause

of epileptic seizures. Secondly, he found that very few of the adhesions antedated the onset of the epileptic seizures, and in only four cases out of the two hundred and fifty could the symptoms of intestinal stasis due to adhesions be considered as the result of the lesion found at autopsy. In his first class, those that may be considered a factor in the causation of chronic intestinal stasis, there were twelve cases. In his second class, in which adhesions resulted from chronic intestinal stasis, there were twenty-five cases, and under a separate classification there was one case of adhesions due to hernia. Whatever may be the influence of intestinal stasis in epileptic seizures, Caro's investigations therefore indicate that adhesions are of little importance as a primary cause.

METHODS OF RESUSCITATION.

It is now generally believed that, in so far as manual methods of artificial respiration are concerned, the Schaefer is to be preferred. Meltzer (*Medical Record*, July 7, 1917), in an admirable but brief history and analysis of methods of respiration, quotes Schaefer to the effect that "if he were confronted by the task of resuscitation he would kneel astride over the subject and perform the simple motions of horseback riding without employing his hands and arms at all." Meltzer further states that this simple method of employing the prone method could be readily combined with the use of his own pharyngeal insufflation apparatus, and the operator who is performing the Schaefer method could at the same time manipulate with one hand the respiratory valve and with the other hand regulate, when necessary, the T-tube. But the operator must learn to move the ring of the valve to the left (expiration) synchronously with throwing his body downward upon the individual, and to move his thumb to the right (inspiration) simultaneously with the raising of his body from the individual.

Meltzer in his historical résumé alludes to the interesting procedure called fumiga-

tion, consisting in filling the large bowl with tobacco smoke, practiced with enthusiasm for nearly forty years; finally tabooed by the Royal Humane Society. Aside from the barrel method, artificial respiration was performed by inflation of the lung from mouth to mouth while the nose of the victim was kept closed, a method which seemed to have been long in practice in reviving the still-born, and which, in this domain, is even now in use. At the time of our Revolution the bellows method became popular. John Hunter constructed a double chamber, one for filling the lung, the other for emptying it. The bellows accepted by the Royal Humane Society had connected to it a tube which was introduced into one nostril while the other nostril, as well as the mouth, was kept closed, and the cricoid was lightly pressed backward to prevent the insufflated air from passing down into the esophagus. For forty years bellows were recommended by the Royal Humane Society; later their approval was withdrawn.

In 1903 Schaefer reported on the prone method: "The subject is placed face downward, the chest resting directly on the floor. The operator kneels astride the prone subject and places his hands over the lower ribs and the lumbar parts on each side of the spine. To produce the expiratory movement the operator, keeping his arms outstretched, brings the weight of his body on the lower dorsal region of the patient; the abdominal viscera are hereby powerfully compressed and forced against the diaphragm and lungs, which are thus brought into a position of ultra-expiration. The recoil which occurs when the operator's weight is withdrawn causes an inspiration."

As to Laborde's method of traction of the tongue, Meltzer states that although it can hardly be considered as a method of artificial respiration, there is no doubt that in some instances, especially in accidents from anesthesia, a few tractions of the tongue may reestablish respiration. It is evident that in most of these cases the aid is rendered by lifting the epiglottis away from the entrance into the larynx. However, it is not this effect which Laborde had

in mind. He states that he succeeded with his method in resuscitating from death even after there was no respiration for an hour. Laborde believes that the effect is due to reflex action through the glossopharyngeal and other nerves. After Laborde's communication there were some favorable reports from the use of his method, especially in France.

In the last seven or eight years enormous efforts have been made in this country to introduce mechanical resuscitation machines. Most of these efforts are distinguished from all foregoing attempts by one deplorable characteristic: viz., that activities in the foregoing period were stimulated practically solely by humanitarian and scientific intent, nearly all apparatus and machines which are introduced at present, and which represent a greater or less unscientific publicity, have one unpleasant feature in common, viz., that the plain and unveiled commercial construction which is evidently the sole motive for their introduction to the public is accomplished by the usual means by which commercial products try to gain headway, namely, by a more or less extensive advertising. It is rather a sad chapter in the history of resuscitation.

After alluding to the misleading nature of uncritical statistical data, Meltzer brings up the question of respiratory volume. He notes that Schaefer found that his method of artificial respiration gave a larger volume than the supine or Schaefer's method; this in the normal individual. His conclusions, however, are open to criticism. In either method the respiratory volumes obtained are about one-half, or less, of those obtained in normal respiration, and that none of the methods are in a position to keep up the respiration for any length of time when the respiratory mechanism is in a state of complete failure.

Meltzer tested his method in dogs and animals. The respiratory muscles, or rather the diaphragm, being completely paralyzed if the method of artificial respiration is continued until the circulation comes sooner or later to a standstill. When, however, the method is

efficient the circulation can be kept practically in a uniformly normal state for many hours, although the animal remains completely paralyzed.

Regarding the manual methods the longest maintained circulation of a curarized and anesthetized animal was twelve minutes by the Sylvester method, even when the tongue was kept pulled out by means of the forceps. By the Schaefer method, with the anterior extremities stretched forward, the longer period during which the circulation was kept going amounted to about eighteen minutes. In the latter case the movements were so energetic that the dog's liver was found to be ruptured.

As to the efficiency of the pulmotor, that of the Bureau of Mines, Meltzer has investigated on a large number of dogs, and the results deserve a more extensive statement. The pulmotor was applied by means of a mask fitted especially for each dog; the tongue was kept withdrawn. In some instances the trachea was connected with a manometer to establish the pressures during inspiration and expiration. The pulmotor is driven by the force of a specially adapted oxygen tank, the contents of which showed only 26.75 per cent oxygen. Out of a large number of dogs the circulation of only one could be maintained for one hour, the circulation stopping when they were left exclusively to the effect of the pulmotor. The manometer left in the trachea showed, as a rule, a comparatively small pressure, the utmost 40 millimeters of water. When the thorax is kept open it is observed that, practically without exception, with the continuation of the use of the pulmotor the size of the lungs gradually became smaller and smaller. When the pulmotor had been used for some time the lungs, in many cases, presented an uneven appearance—small, collapsed areas alternating with emphysematous ones. The success of the pulmotor was more satisfactory when it was connected directly with the trachea by means of a tracheotomy tube. The inefficiency of the machine seems to be caused essentially by two elements. The first element is its automatic arrangement.

While the air-oxygen passes from the nasopharynx into the trachea it seems to meet with some sort of obstacle which converts prematurely the inspiratory movement into an expiratory one. The result is an insufficient exchange of respiratory gases. The second deleterious element is the suction, an element inherent to other machines on the market. Apparently in many cases the suction closes most of the bronchioles before it succeeds in removing deleterious expiratory gases from the alveoli. In these instances the air within the dead space is caused to move, which simulates respiratory movements without producing an actual exchange of gases.

In regard to intratracheal insufflation introduced seven years ago by Meltzer and Auer, the writer regards it as the most reliable method of artificial respiration. He has kept many animals for more than twenty-four hours continually under ether administered by the method of intratracheal insufflation without causing any injury to them. Several cases of poisoned human beings without any respiration, intratracheal insufflation has kept alive for more than fifteen hours until the patients recovered. The introduction of the tube into the trachea requires some dexterity and practice, and any of the apparatus now on the market used for keeping up the intratracheal insufflation is usually expensive. It is needful to simplify the method and make it available for a larger and more immediate application.

Meltzer thus describes his last modifications: There is first a foot bellows, which may be substituted by an air-oxygen tank, next the respiratory valve, a small tube which can conveniently be kept in the hand when using it; the tube has a protruding movable ring into which the thumb fits. When the thumb moves the ring to the right side the driven air or oxygen passes through the respiratory valve to the pharynx and lungs. When the ring is moved to the left side the escape from the respiratory valve is prevented and the air or oxygen accumulates meanwhile in a large bag, interpolated between the source of

pressure and the respiratory valve, while an aperture appears above the ring for the escape of the expiratory air from the lungs. The presence of the bag offers the advantage that during the expiratory phase the air or oxygen may accumulate in the bag and be ready for a full inspiratory blast as soon as the thumb moves the ring to the right side. Third, the pharyngeal tube with a flat surface at its lower side which rests on the tongue, and a curved surface on its upper side. At the pharyngeal end of the tube the upper surface is longer than the lower one. The external end of the tube has a protrusion with a neck for connection with the respiratory valve and an opening through which a stomach tube may be pushed down through the esophagus into the stomach. When no tube is in use this opening is closed. A T-tube is interpolated between the respiratory valve and the pharyngeal tube. The T-tube carries on its rubber end a clamp screw, which, when not screwed down, permits most of the air to escape through the tube, while on the other hand, by gradually screwing down the clamp upon the rubber tube the amount of air entering the pharyngeal tube will gradually increase.

This T-tube arrangement supplants the mercury valve of the earlier form of apparatus and is used with great advantage for the same purpose—that is, to prevent the harm of an excessive pressure. Next a padded wooden board is employed for compressing the abdomen by means of belts.

The rubber tubing must have thick walls so that it will not kink; metal and no glass tubes ought to be used for all other connections. All these parts ought to be kept connected and in readiness in a handy small bag. The bag should contain (1) a stomach tube which fits into the external opening of the pharyngeal tube; (2) an appropriate tongue forceps; (3) a roll of tape and a pair of scissors. Bellows, rubber tubing, etc., should be frequently examined for their efficient activity, in order that the apparatus will not fail when its application is needed in an emergency.

The technique of application is as fol-

lows: First, the application of the abdominal board—in order to prevent the escape of the insufflated air into the stomach and the intestines. Second, to pull the tongue as far as possible by means of the tongue forceps. Third, to insert the pharyngeal tube of the readily connected apparatus deeply into the pharynx as possible, with the flat side of the tube on the tongue. The pharyngeal tube should now be tied to the tongue with the means of tape—not too tight. The pharyngeal tube has two purposes: (1) it prevents the falling back of the pharynx and the end of the tongue and of the glottis; (2) it keeps the pharyngeal tube in position. The working of the bellows with one hand and the moving of the ring of the respiratory valve with the thumb of the other hand, should be started immediately after tying the tongue to the pharyngeal tube. At the beginning of the procedure the pharyngeal tube should be kept open; it should be gradually screwed down until the patient shows a distinct raising when turning the ring to the right, and falling when turning to the left. The heaving of the chest should not be too strong. The degree of the artificial respiration can be readily controlled by means of the screw, which should be turned gradually, and which will then be sufficient for accomplishing all the good which can be obtained from the use of a mechanical valve. Moving of the ring thirteen to fifteen times per minute will give a satisfactory artificial respiration; or the operator may turn the ring by the rhythmic moving of the thumb by the rhythmic of his own respirations. In case of need of artificial respiration in an individual who has had some training, the operator can accomplish all three procedures and maintain the artificial respiration in less than a minute after finding the victim.

Should the respiratory failure take place while the abdomen is open, a condition in which the abdominal board cannot be applied, the plate at the outer end of the pharyngeal tube should be opened and the stomach tube pushed through the pharynx into the stomach; any surplus of air may enter into the stomach and will be promptly escape through the stomach tube. This device has been tested on

paralyzed animals, and it was found thoroughly capable of properly supporting the function of respiration. The insertion of the stomach tube may be used even where the abdominal board is being applied; in fact it may be saving time by introducing the stomach tube immediately on inserting the pharyngeal tube; the application of the abdominal board may be carried out later with greater leisure. On the other hand, the application of the abdominal board has the further advantage that it drives a part of the blood contained in the splanchnic region into the heart and thus supports to a degree the failing circulation.

The size of the pharyngeal tube which goes with the apparatus is generally sufficient to prevent too much of an escape of the insufflated air through the mouth; furthermore, the prolongation of the curved side of the tube raises the soft palate and thus prevents the escape of air through the nose. However, we need not care about slight escapes of air, since the amount of inflated air can be easily controlled by means of the T-tube and the clamp screw. Meltzer recommends this form of artificial respiration only in emergency cases.

On the circulatory side of the question massage is sometimes an invaluable procedure in restoring the heart's action. Experimentally the administration of adrenalin by the intravenous or intracarotid method has seemed helpful. The compression of the abdomen, as employed in Meltzer's artificial respiration, drives a part of the blood from the splanchnic region into the heart and from there into the general circulation. Experimentally it is capable of increasing the blood-pressure from 20 to 30 mm. of mercury. The application of heat, friction, the mechanical and chemical stimulations of the mucous membrane of the nose, may sometimes render contributory service.

Stimulation of the pudic regions or of the soles of the feet frequently exerts an effect upon the respiration, if the respiratory mechanism is not entirely paralyzed.

All first-aid men must be impressed with the fact that their first attention must be given to the respiration; it is not necessary to impress them that all the other means have no value. The laboratory studies concerning artificial respiration seem very complete. The failure of clinical observation to always corroborate is largely due to the inaccuracy of such observation. At one time current literature was flooded with reports of successful cases treated by the Laborde method of traction of the tongue, implying necessarily preservation of the reflex. It is to be noted that Keith, quoted by Meltzer, who collected the statistics from 1785 to 1911, when warmth and bellows were used, reports that 54.8 per cent of cases were unsuccessful; whilst in 1832 to 1851, when warmth and friction were used, there were only 10 per cent of unsuccessful cases.

Those who have seen the various mechanical devices put upon the market and provided with valves and a face-mask in actual use in the time of emergency have been somewhat strongly impressed with their power for evil as well as for good. The physiologically entirely inadequate methods of Sylvester and Schaefer have apparently yielded hundreds of successes. As opposed to the scientific proof that neither of these methods is able to sustain life for more than ten minutes unless they be associated with respiratory movements, it is quite true that they have been successful after many hours of no apparent breathing upon the part of the patient. None the less insufflation by simple non-traumatizing apparatus would theoretically commend itself and clinically has proven its superiority.



REPORTS ON THERAPEUTIC PROGRESS.

THE LEUCOCYTE COUNT AS A GUIDE TO TREATMENT OF WOUNDS.

The *British Medical Journal* of April 7, 1917, quotes Stabsarzt Lindemann (Bruns, *Kriegsschrift*, Heft 24, p. 608), who has drawn attention to the great practical value of the leucocyte curve as an indication for surgical interference in gunshot wounds. In such wounds the initial infection was combated in the body with a twofold result. On the one hand, where resistance was good, the activity of the infection was suppressed either permanently or for a varying period—latent infection. On the other hand, where resistance was weak, the activity of the infection persisted—manifest infection. The treatment, conservative or active, to be adopted depended on the early recognition of the nature of the infection, whether latent or manifest. As an illustration, two cases of gunshot fracture are described in which an immediate operation was performed for removal of fragments; in both there was a similar rise in temperature and pulse frequency; subsequently in the one case a suppression of the active infection, in the other its continuance, necessitating another operation.

The clinical discrimination between such cases involved a loss of several days, and Lindemann claims that this could be avoided by making use of the leucocyte curve. For this purpose it was necessary that there should be a daily record, the curve being most conveniently plotted on the temperature chart. The initial leucocytosis was extremely rapid, and was completed within a few hours from the wounding, the leucocytes increasing two to fourfold. During the next twenty-four hours the leucocytes as rapidly diminished, becoming normal, or almost normal, in number. If the infection had been rendered latent by this reaction no further increase took place. If, on the other hand, the infection proved to be manifest, a second sudden or gradual leucocytosis occurred. Lindemann embodied these conclusions, which were based on a study

of his cases, in four types of leucocyte curve:

(a) Typical of latent infection, leucocyte count four hours after wounding 34,000. A few hours later almost normal; further course normal.

(b) Typical of latent infection, leucocyte count twenty-four hours after wounding 34,000. No leucocytosis.

(c) Manifest infection. First leucocyte count and a half hours after wounding 34,000. After a few hours a fall almost to normal, with, in the next twelve to thirty-six hours, a second rise persisting until operative interference, after which fall to normal.

(d) Manifest infection, but first leucocyte count twenty-four hours after wounding 34,000. leucocytosis (the initial rise and fall having been registered); a few hours later a sudden rise in the curve, persisting until relief by operation.

The indications deducible from the leucocyte curves were as follows: High leucocyte count at first denoted the initial reaction; a fall to the normal without further rise indicated conservative treatment. Low leucocyte count on the second day did not denote the absence of manifest infection. A rise on the second day strongly suggested manifest infection, and its continuance confirmed it. A relatively low leucocyte count in spite of the presence of a manifest infection denoted a comparatively non-severe infection.

THE TREATMENT OF DIABETES MELLITUS.

In the *Lancet* of April 28, 1917, LAMSON states that the following is a sketch of the line of treatment which he has carried out with much success in many cases of diabetes mellitus during the last few years. Recently many new methods of treatment have been published, some of which are of distinct service. Certain of these methods, however, have disad-

and are occasionally followed by unpleasant symptoms. The line of treatment briefly sketched in this article will, he thinks, be found free from risk if carried out in the class of cases indicated. (To limit the length of this article many of the details of the treatment have been omitted.)

A routine examination of the patient is first made, complications noted, and the abnormalities of the urine determined. When certain complications (affections of the lungs, heart, kidneys, etc.) are detected a special form of treatment may be required and a rigid diabetic diet may not be desirable. Such cases are not considered in this article.

When the case is one of diabetes without these complications a diabetic diet will be usually suitable. But the form of the disease must first be determined. When the urine gives persistently a claret coloration with perchloride of iron, and if this is not due to drugs, and if other indications of decided acidosis can be detected, the case requires very careful and special treatment. These cases will be briefly considered at the end of this article.

If, then, no complications can be detected which require a special form of treatment, and if the urine should give no reaction with perchloride of iron, and no other signs of decided acidosis can be detected, the following course of treatment may be carried out:

1. The patient is first placed on Diet I—an ordinary rigid diabetic diet, but with the addition of three ounces of white bread daily.

2. If the glycosuria is not checked in a short time (few days) the white bread is promptly replaced by a pure diabetic bread (free from starch, or only containing the smallest amount thereof), such as biogene bread and ponos biscuits, protein bread, etc.—Diet II.

3. If this fails after a fair trial of 10 or 14 days the following—Diet III—is often successful if the patient is able to rest at home on a sofa for a short time:

For one week only food is taken in small quantities every two hours from 8 A.M. to

10 P.M., and the foods are eggs, milk, cream, custard, coffee, tea, and beef tea. The following is the diet sheet:

8 A.M.: Tea or coffee with one tablespoonful of cream. One egg (poached, buttered, or boiled).

10 A.M.: One glass of warm milk (10 ozs.).

12 noon: Custard unsweetened (containing one egg and half a pint of milk).

2 P.M.: One glass of warm milk (10 ozs.) or cream (1 oz.) in warm water (10 ozs.).

4 P.M.: Tea with one tablespoonful of cream; one egg (poached, buttered, or boiled).

6 P.M.: Cream (1 oz.) in 10 ozs. of warm beef tea.

8 P.M.: One glass of warm milk (10 ozs.).

10 P.M.: Cream (1 oz.) in warm beef tea.

In this diet (or in the modification following) the patient received daily 3 or 4 eggs, 2 to 3 ounces of cream, 2 pints of milk, in addition to tea, coffee, and beef tea.

The various small meals may be changed in order or altered if the patient desires. Thus, at 2 P.M. cream and beef tea may be taken in place of milk, and a glass of milk at 6 P.M. in place of cream and beef tea. At 8 P.M. one egg beaten up and added to 10 ounces of warm beef tea may be taken in place of the glass of milk, or a poached egg and half a pint of beef tea if the patient prefers. At 10 a glass of milk may be taken in place of cream and beef tea. Also, if the patient prefers, an egg (poached or boiled) and a glass of milk may be taken at 12 in place of custard.

This diet often checks the glycosuria in a few days or by the end of the week. If the glycosuria is not checked by the end of the week the diet may be continued for a few days longer; but if it then fails it should be discontinued and the patient placed back on Diet II for a few days. If Diet III has failed to check the glycosuria the patient may be placed on Diet IV of casein or biogene and cream.

4. Diet IV of casein or biogene and cream.

The patient is given for seven or ten days a glass of casein or biogene and cream with water every two hours from 8 A.M. to 10 P.M. The casein preparation lait-proto No. 6 will probably be the most satisfactory for the majority of patients. A cup of tea or beef tea, or both, may be also taken, if the patient desires, twice a day.

The mixture of casein and cream and water is prepared as follows: One tablespoonful of casein, or lait-proto No. 6; one tablespoonful of cream; mix well in a tumbler with a spoon, then add hot water (or cold if preferred) very gradually, mixing well until the tumbler is full. (The fluid may be sweetened with saccharin or flavored with nutmeg if desired.)

In place of one tablespoonful of casein two tablespoonfuls of biogene may be used if the patient does not like the taste of the casein. It should be mixed with two tablespoonfuls of cream and the water added as just described.

Many patients take the casein or biogene quite well, others find both unpalatable, and some cannot take either. Lait-proto No. 6 may be taken quite well when ordinary casein or biogene cannot be taken.

If we wish to avoid using diabetic breads instead of following the order just indicated the trial of Diet II may be omitted, and if Diet I fails Diet III may be tried at once; or if the patient likes the taste of casein or biogene, and can be seen daily, Diet IV may be tried before Diet III (at once after Diet I).

Williamson has found Diet III (eggs, cream, milk, beef tea, etc., as indicated) of very great success; it is simple, palatable, and often very successful. It can be taken by nearly all patients and it is less expensive than diabetic food. It can be usually taken quite well by patients who cannot take casein or biogene. It is very useful in the case of diabetic children. It is often very successful both in mild cases and cases of medium severity, and sometimes in severe cases. In some cases, like all other treatment, it fails. It often removes the glycosuria promptly in a few days or a week, though an ordinary rigid diabetic diet had

previously failed. After taking this seven or ten days often the patient then take ordinary rigid diet for a period without glycosuria returning previously on such a diet the glycosuria continued. Probably it is not so successful as the treatment with casein or biogene, but if it fails the latter treatment may then be tried, or a combination of the two methods. Diet III or IV should be continued for seven or ten days only and are to be regarded as methods of treatment which are usually much more successful than an ordinary rigid diet in removing the glycosuria temporarily and the after-effects probably disappear longer. If later the sugar returns in the urine the methods may be repeated. Diet IV may be successful when Diet III has failed. In a few cases with persistent diacetic acid reaction in the urine Diet III or IV removes the diacetic acid as well as the sugar, but is not always successful in such cases.

After Diet III or IV has been continued for seven or ten days the patient is placed on Diet II if the glycosuria continues. If the glycosuria has been checked, Diet III or IV is gradually changed to Diet I. *Ponon's* biscuit is allowed at 8 A.M. and with the egg and tea. One or two later bacon and green vegetables and *tard* are allowed at 1, in place of the *tard* at 12 and 2, and later Diet V and *tard* are allowed.

Of course, the Diets III and IV may not be successful in all cases, but they are always worthy of a careful trial. When the urine persistently gives a claret coloration with perchloride of iron. In these cases caution is necessary. Sometimes Diets III and IV are not successful.

5. If all the diets already described have failed to check the glycosuria, then for a short time a diet of suitable vegetables, eggs, and fatty foods may be tried.

Breakfast: Coffee (or tea) with eggs (battered, poached, or boiled), tomatoes or mushrooms; suitable bread or biscuits; butter. Dinner:

cooked in any way. Any of the following vegetables: cabbage, cauliflower, Brussels sprouts, turnips, French beans, spinach, broccoli, boiled walnuts, asparagus, vegetable marrow, tomatoes, mushrooms, salad, lettuce, cucumber, watercress, celery, radishes; custard; suitable diabetic biscuits or bread. Tea or evening meal: Tea and cream; eggs (buttered, poached or boiled); or Welsh rarebit, cheese; or salad, lettuce, cucumber, mushrooms, tomatoes, boiled egg and spinach, watercress; suitable diabetic bread; butter. Or the following diet may be tried for a short time:

Breakfast: Tea or coffee with cream; one egg and tomatoes or mushrooms or spinach; also one ponos biscuit or other similar biscuit. At 11 A.M.: Two tablespoonfuls of cream in half a pint of warm beef tea. Dinner (12.30 or 1): Beef or tomato soup or one sardine and one ponos biscuit. Afterwards one or more of the following vegetables: cabbage, cauliflower, Brussels sprouts, vegetable marrow, broccoli (curly green), boiled celery, asparagus, French beans, turnips, tomatoes, mushrooms, boiled walnuts, Brazil nuts sliced and fried in butter; custard; stewed rhubarb, gooseberries, or cranberries with cream. Tea (4 to 5): Tea with cream, tomatoes or asparagus or celery or mushrooms, lettuce, salad, cucumber, jelly; one ponos biscuit. Supper: Beef tea and cream (as at 11).

6. If these diets fail to check the glycosuria then drugs may be tried. The drugs which Williamson has found most useful are: sodium salicylate, aspirin, and salicylate of quinine. These drugs may be given along with Diet II, or I, or V. Williamson has been able to demonstrate clearly the distinct effect of sodium salicylate and of aspirin in diminishing the glycosuria in certain cases of the milder form of diabetes, and also in cases of medium severity. Some patients take sodium salicylate better, others aspirin.

The dose of these drugs has usually to be increased to 15 grs. (or more) four times a day before definite effects are obtained, and a careful watch should be kept for toxic symptoms. It is better to use the natural

salicylate. In certain cases salicylate of quinine, grs. 3 or 4 or more, three or four times a day, has appeared to be of distinct service, though Williamson has not been able to clearly demonstrate this by careful hospital observations, as in the case of the two drugs just named.

7. Fast days are sometimes of service. On these days the patient fasts, and takes only tea or coffee, beef tea, or whisky-and-soda several times, and no other food. In the less severe cases the glycosuria ceases on these days, but it often returns in a day or two. It may, however, not return for many days, and occasionally for a considerable time it is much less than before the fast days. But very often Williamson has found the results of little permanent value. A fast day once a week is useful in some cases, but he much prefers the treatment with the two-hourly fluid diets III and IV, described in this article. He also prefers these diets to the more prolonged fasting which is being so frequently carried out.

When the patient suffers from insomnia or marked neurasthenia bromide of potassium (grs. 30 at night, or 30 early in the evening and 30 late at night) is suitable. Overwork, mental strain, and worry often increase the glycosuria, and should be avoided as much as possible.

If none of these diets or treatments check the glycosuria, then we must be content if we can diminish it by the various treatments described. After a time it is well to allow a small amount of white bread or milk, or both, especially if the urine should give a persistent reaction with perchloride of iron.

In some cases the most careful treatment fails; in others it is successful for a shorter or longer period and then fails. But in some cases it is successful for many years, or even to the end of life.

If we have checked the glycosuria by diet or drugs, then Diet II may be allowed, and later Diet I. Still later more white bread is cautiously allowed, and then other starchy carbohydrates, if no glycosuria returns. But it is always advisable permanently to forbid sugar and sweet foods containing sugar. The urine should be watched

and the diet made more rigid if glycosuria returns, and less rigid when the glycosuria ceases. In this way it is possible in some cases to keep the glycosuria in check for many years, or occasionally until the patient reaches advanced age and dies of some other disease.

RECENT RESULTS IN THE SERUM TREATMENT OF CEREBRO-SPINAL FEVER.

ROBB in the *British Medical Journal* of April 14, 1917, in summing up his conclusions in a long article says that all the recent work in cerebrospinal fever goes further to prove that the most hopeful line of treatment is by lumbar puncture, drainage, and the intrathecal injection of carefully prepared polyvalent antimeningitis serum; and that the most important factors which make for success are early treatment and sufficient dosage.

TREATMENT OF CASES OF ACUTE POLIOMYELITIS DURING 1916.

PEABODY in the *Boston Medical and Surgical Journal* of May 3, 1917, tells us that of the 123 cases of poliomyelitis seen, 54 were first visited in the preparalytic stage, 65 were recently paralyzed cases, and four were cases of old paralysis. Of the total of 54 preparalytic cases seen, 51 were treated with immune serum. Two of the untreated cases were apparently of the abortive type of the disease, and it was considered unnecessary to give them any injection. Of the 51 cases treated with intraspinal injections of immune serum, 35, or 69 per cent, recovered without paralysis; 11, or 21 per cent, recovered with paralysis; and 5, or 10 per cent, died. In the 11 paralyzed cases the results were slight in six.

Sixty-nine paralyzed cases were seen. Of these four had had the disease a long time before they were seen, and 65 had been recently paralyzed. Of the latter cases 60 were treated with immune serum. It is rather difficult to form any accurate conception as to whether cases in this group

improved or did not improve as a result of treatment, but a rough classification indicates that 8, or 12 per cent, showed rapid improvement, while 33, or 48 per cent, did not improve much after the administration of the serum, or became worse. Twenty-one cases, or 32 per cent, died. In three cases, or 5 per cent, the results were unknown. In the total of 123 cases there were 26 deaths, giving a mortality of 21 per cent. This is just about the average mortality of the epidemic.

In discussing the effect of treatment by means of intraspinal injection of immune serum it seems wise to disregard the cases which were already paralyzed when treatment was administered. One could not expect any definite improvement after the spinal cord was already involved sufficiently to cause a peripheral paralysis, but one hoped that the progress of the disease might be stopped. Whether such a result was occasionally obtained or whether the cessation of the spreading of paralysis was always spontaneous, it is, of course, impossible to determine accurately.

The results of treatment in the preparalytic stage of the disease are at first sight rather encouraging, but the number of patients is large enough to allow the drawing of fairly definite conclusions. The mortality was 10 per cent, which is only one-half of the general mortality of the epidemic. The majority of the fatal cases were, moreover, acute fulminating instances of the disease, and it is not conceivable that any method of treatment could have been of value. Only 21 per cent of the cases (excluding the fatal cases) became paralyzed at all, and in more than one-half of these the paralysis was extremely mild. Of most importance, however, is the group of patients in whom evidence of paralysis appeared. This includes 69 per cent of the total number of cases seen in the preparalytic stage. This result is apparently very gratifying, but critical consideration requires a comparison with the outcome of a similar group of untreated cases. The necessary data for control are not available from the

experience, but Dr. George Draper of New York has been kind enough to put at their disposal some of the results as yet unpublished, obtained by him in the study of the present epidemic in Long Island. According to these statistics of 85 preparalytic cases, in which the diagnosis was proved by lumbar puncture, and in which no serum was administered, 48, or 56 per cent, developed no paralysis. The results in Peabody's serum cases were thus about 10 per cent better than were the results in Draper's untreated cases, but in the consideration of the effect of a therapeutic measure in so variable a clinical condition as acute poliomyelitis, such a difference must be regarded with great conservatism. It is, however, also of interest to note the results of the administration of serum by other workers. Zingher reports that of 54 cases treated in the preparalytic stage, 44, or 82 per cent, did not become paralyzed. Twenty-five of these patients were seen at the Willard Parker Hospital, and of this group 24, or 96 per cent, did not become paralyzed. Zingher also reports that 9 out of 10 cases treated intraspinally with normal human serum failed to develop paralysis. Amoss and Chesney treated 14 cases in the preparalytic stage of the disease by intraspinal and intravenous or subcutaneous injections of immune serum. Two of these died, 2 developed slight paralysis, and 10, or 71 per cent, remained unparalyzed. The best results were obtained in the patients who were treated earliest (within 48 hours of the onset), and who received the largest amounts of serum (over 30 Cc.), both intraspinally and intravenously and subcutaneously. The considerable variation in the results obtained by different workers in the administration of immune serum may be due in part to differences in technique, but no doubt the character and number of cases studied are an important element. None of these series is as large as it should be when one considers the great variation in the clinical course of the disease under consideration. For the proper interpretation of the results of treatment it is essential that we should have a much more complete

knowledge of the natural history of the disease. At the present time we have only an imperfect idea as to what proportion of persons affected with the disease become paralyzed even if no treatment is instituted. Nevertheless there is apparently a general agreement among those who have used the immune serum as to its harmlessness, and as to the fact that in certain, possibly in numerous, instances its administration is beneficial.

While the results obtained in the treatment of acute cases of infantile paralysis by the intraspinal injection of immune serum have been somewhat less satisfactory than might have been hoped, it is of some importance that this community has had its own experience with what has seemed to be the most promising method of treating the disease. There is evidence in favor of the use of serum in the preparalytic stage, but its administration in paralyzed cases, except where the disease is progressing, should probably be avoided, for it is quite possible that further harm might be done to the spinal cord by increasing the pressure in the spinal canal. It is also probable that in any further work with the treatment of the disease the intravenous injection of serum in very early cases should be taken up.

The work on the diagnosis of poliomyelitis with the aid of the examination of the spinal fluid has been of considerable importance. In all early cases the examination of the spinal fluid has shown evidence of a meningitis, and the cell count has ranged from 34 to 1980 per Cc. in the preparalytic stage. In general the more severely affected patients have shown the higher cell counts, but this is not at all a constant finding. In the earliest stages of the disease about 40 to 90 per cent of the cells in the spinal fluid are of the polymorphonuclear type, and with the progress of the disease the mononuclear cells tend to predominate. In general, the cell count, which is done rapidly and easily, has proved to be the most satisfactory method of making a diagnosis in preparalytic cases of infantile paralysis. Although the clinical

picture of the acute stage of the disease is fairly typical, so that a physician who has seen a number of cases is often able to make the diagnosis, nevertheless any confirmatory evidence is of great assistance. Such evidence the examination of the spinal fluid seems to provide.

Of great importance, as indicating the value of the examination of the spinal fluid as a diagnostic measure in acute poliomyelitis, are the results obtained from the lumbar puncture of cases which proved subsequently not to be infantile paralysis. This spinal fluid was examined in 31 such cases. In two instances a cell count of 12 and 15 respectively was obtained, and in all other instances the cell count was below 10. This evidence is of great importance as showing that in the febrile, gastrointestinal, and other conditions most likely to be confused with infantile paralysis the spinal fluid is almost always normal. All their cases were followed in such a way that there is no reason for them to believe that the diagnosis of infantile paralysis was made in cases in which it was not justified. There is, however, a certain source of error in that some of the so-called abortive cases may never develop to the stage of involvement of the nervous system. Draper's results make this quite probable.

MOUTH-WASHES IN HEALTH AND DISEASE.

To the *British Medical Journal* of April 14, 1917, HELEN P. GOODRICH reports on experiments made with pure and mixed cultures of organisms from pyorrhea pockets and containing, among other bacteria, streptococcus, pneumococcus, pneumobacillus, staphylococcus, and *B. coli*. It is not desirable here, however, to go into details as to specificity of the antiseptics, especially as their actions *in vivo* are, of course, liable to be different from their actions *in vitro*. All that she wishes to point out is that in every case there was a growth from the control and almost as invariably none after the action of a saturated thymol solution for half a minute or more (one or two excep-

tions being attributed to the presence of spore-forming bacteria). After one quarter of a minute's action of the thymol there were always two or three colonies. This record was not attained by any liquid tested except 2-per-cent chloram and dilute iodine solutions, which are as suitable as mouth-washes for general use as will be explained below.

These experiments show that a saturated aqueous solution of thymol is a very antiseptic for ordinary mouth bacteria and it is the most satisfactory mouth-wash Goodrich has been able to find. In the mouth kept under observation (some for more than a year) in which this solution has been used at least every night, the growth of *leptothrix*, as well as the bacteria which can easily be cultivated artificially, has been very much diminished, so that there is practically no accumulation of tartar. In the case of pyorrhea in which the gums are too sore for even a soft brush to be used, the gums should be massaged with the fingers and then well washed with the solution, some of which should be retained in contact with the gums for some minutes. An antiseptic solution is much to be preferred to a powder. These latter, owing to the necessary presence of some gritty substance such as chalk, tend not only to injure the gums but also to clog the "pockets," the most undesirable result.

The saturated solution of thymol has a pleasant taste, causing a temporary burning sensation, and stimulating a flow of saliva. It is a stronger antiseptic and less irritating than carbolic acid, to which it is closely related, being also a monohydric phenol. It is not acid, and is free from the corrosive action of phenol. It may be used as a gargle as well as a mouth-wash, since it is harmless if swallowed, large doses being sometimes given as an intestinal antiseptic. According to most standard works on organic chemistry and pharmacology, only a part of thymol dissolves in 1500 of water (others give the solubility as 1:1000 or even 1:1000). According to the first method a saturated solution would contain only 0.06 per cent of thymol. Notwithstanding

it is a remarkably good antiseptic, a fact which has, of course, long been known, though practically no use has been made of it by the general public. For ordinary use a saturated solution may easily be prepared by putting a lump of thymol into a bottle of cold or warm tap water; the water must not be hot, for thymol melts at 51.5° C. It should be allowed to stand for some hours, and should preferably be shaken occasionally. As the solution is used, the bottle may be filled up with water.

According to the solubility (1:1500) given above one gramme of thymol is enough to make $1\frac{1}{2}$ liters of solution, or 1 ounce as much as 9 gallons. In 1914 the price of pure thymol was 8d. an ounce. Owing presumably to the fact that its extraction from the common wild thyme is not carried out in this country the price of it just now is abnormally high. Still, even at the present price of thymol (3s. 6d. an ounce), the cost would be less than 5d. a gallon. Such a mouth-wash should be within the reach of every one. As a matter of fact, thymol forms the active part of many dentifrices or mouth-washes. One dentifrice tested gave quite good results, and was found to contain a saturated solution of thymol according to the prescription on the label. All of these proprietary mouth-washes are sold at approximately 5s. a pint. In traveling, and especially on active service, nothing more convenient as a dentifrice or mouth-wash can be imagined than a lump of thymol in a small bottle to be filled with water as occasion offers. If more generally used it would put an end to the distressing gingivitis and pyorrhea so often following neglect of the teeth during a sojourn in the trenches.

Thymol is much more soluble in glycerin than in water (1 part dissolves in 190 glycerin), so that if glycerin be added to the tap water used a stronger solution of thymol may be obtained, without, however, increasing its antiseptic power. The presence of glycerin may be desirable, and of course the solution can always be diluted with more water should it be found to be irritating. As a general rule the aqueous

solution, undiluted, will be found to be a suitable strength. There are no official preparations in the British Pharmacopœia, but several non-official ones are used to some extent—for example:

Liquor thymol: 1 part thymol in 100 parts 90-per-cent alcohol, the resulting solution to be diluted in the proportion of $\frac{1}{2}$ pint to a gallon. This gives the final concentration of thymol as 1 in 1700, or 0.058 per cent. This preparation therefore contains slightly less thymol than a saturated aqueous solution (0.06 per cent, taking the lowest solubility 1:1500). Experiments showed that a saturated solution of thymol had more effect in one minute than a half-saturated one had in four minutes (inverse squares of concentrations). It is therefore very necessary to have the solution as concentrated as possible—that is to say, saturated.

Boracic acid has given disappointing results. A saturated solution must act for more than two minutes to be effective, and was by no means always satisfactory in five minutes. If used, care should be taken to obtain a really saturated solution by leaving excess of the crystals or powder in contact with the water until no more will dissolve. Such a saturated solution contains 4 per cent of boracic acid; by adding glycerin to the water more may be made to dissolve, but the antiseptic power of the solution is still unsatisfactory.

Unfortunately Bass and Johns, believing the ameba of the mouth (*E. gingivalis*) to be the cause of pyorrhea, recommended the use of a dilute solution of emetine as a mouth-wash.

E. gingivalis is certainly not the cause of pyorrhea, and is quite easily killed by ordinary antiseptics so long as it is not sheltered too much by large accumulations of tartar, into which, as already explained, it tends to burrow. Thymol solutions kill the ameba very rapidly. The well-known amebicidal properties of emetine are due to indirect action on the parasite, and yet one still finds preparations with emetine, or ipecacuanha containing it, prescribed for direct use in the mouth. The uselessness of this drug

for the purpose is well shown by experiments *in vitro*. On several occasions Goodrich has kept *E. gingivalis* under observation in 1-per-cent and 0.5-per-cent solutions of emetine, and found specimens alive and putting out pseudopodia after twenty to forty minutes. Consequently solutions many thousand times more dilute, such as those recommended by Bass and Johns, could hardly have any effective action during the few minutes they are likely to be retained in the mouth. Strong solutions could not be used owing to the great toxicity of emetine. As an ordinary germicide emetine gave very poor results, even in a 1-per-cent solution, being no better than a saturated solution of boracic acid.

Harmine hydrochloride was tested in the first place for its action on amebæ at the suggestion of Captain Gunn. A 0.5-per-cent solution was found to have a much greater amebicidal action *in vitro*, the amebæ being killed instantly, but the germicidal effect was approximately the same as the 1-per-cent solution of emetine. The poisonous character of this alkaloid, however, apart from other reasons, makes it undesirable for general use in the mouth.

Even in such weak solutions as 1 in 3000 iodine is a splendid antiseptic, but its destructive action on the tissues is well known, and it would obviously not make a satisfactory mouth-wash for general use. It is, however, useful to dental practitioners, not only owing to its antiseptic properties, but because it stains the leptothrix and so facilitates its removal.

Even if hypochlorite solutions do not attack the teeth, as is claimed, they are still not suitable for general use owing to their instability.

Chloramine-T (toluene sodium sulphochloramide), which has given such good results when used in solution as a spray for the nasopharynx of meningococcus carriers, was tested in 2-per-cent and 3-per-cent solutions. No growth occurred after submitting films of mouth bacteria to them for any time over fifteen seconds. However, the solutions have an unpleasant chlorinous taste, and this, in addition to

possible action on the teeth and theirappings, at present makes their general use undesirable.

Hydrogen peroxide solutions are readily reduced to be successful in the hands of an ordinary patient. Potassium permanganate, another oxidizing agent, as a deodorant, is sometimes used as a mouth wash. It is by no means ideal, being only a weak antiseptic, and, in addition to staining the teeth, has an unpleasant taste.

Zinc sulphocarbolate (zinc phenol sulphonate) has been recently recommended to be used in 4-per-cent solution as a "mouth wash" in cases of pyorrhea. In Goodrich's experiments she has used chiefly a 1-per-cent solution, and out of nine bacteria submitted to this strong solution for less than two minutes, she has never once obtained complete sterility. In most there were more colonies than thirteen.

Flavine and other dyes with antiseptic properties are obviously unsuitable for general use in the mouth owing to their tinctorial qualities.

To sum up: in health, as well as in the case of oral disease, antiseptic mouth-washes should be used as often as possible, and a really satisfactory mouth-wash, both simple and effective, is a saturated aqueous solution of thymol.

THE EFFECT OF ANESTHESIA ON OPERATION ON KIDNEY FUNCTION AS SHOWN BY THE PHENOLSULPHONAPHTHALEIN TEST AND URINARY ANALYSIS.

To the *American Journal of the Medical Sciences* for June, 1917, COLP contributed a paper in which he says that upon the whole the average case, thirty-six hours after operation, shows very little change in kidney function as demonstrated by the phenolsulphonaphthalein test, although 50 per cent showed urinary changes, which ten days' time were again negative.

The functional activity of the kidney is depressed as the length of anesthesia is increased, while in short anesthesia the kidney might even appear to be stimulated to a slight degree.

As age increases the threshold activity of the kidney is lessened.

Nervous patients, anemic, obese, and arteriosclerotic patients as a rule, show some effect of their physical or psychic state on kidney function.

Preëxisting conditions of albuminuria have a tendency to decreased phthalein excretion, and those cases which have a decreased phthalein excretion, in the majority of instances, show effects of kidney depression as evidenced by careful urinary analysis, although these effects are only temporary.

For long anesthetics and apparently for nervous patients, gas and oxygen as an anesthetic seem to have the least irritating effect on kidney function, as demonstrated by urine examinations.

SACROILIAC STRAIN.

BAER in the *Bulletin of the Johns Hopkins Hospital* for May, 1917, points out that the treatment which must be instituted to effect a cure in cases of sacroiliac strain varies according to the severity, and to the type of case under treatment.

In those cases in which the sacrum is tilted forward, and the pronounced feature is a hollow back, the main principle is to relieve the anterior pulling strain by applying proper support, particularly to relieve the weakened abdominal muscles, and to correct as far as possible the visceroptosis.

In girls and women this can be done by a properly fitting corset, so padded as to support the relaxed stomach and to hold up the floating kidneys. Two extra steels should be incorporated in the corset, on either side of the midline in the back. These steels should not conform accurately to the lumbar lordosis, but tend to diminish it.

Massage and exercises should be given to the spinal and abdominal muscles, so as to increase their power and so relieve the sacroiliac ligaments of a portion of the strain. It is needless to say that, when the strain is produced by any intrapelvic condition, it should be remedied by proper gynecological interference.

In cases of this class in men, when the strain is caused by a pendulous abdomen, a proper brace supporting the lower part of the abdomen is of the greatest service.

In those cases in which the sacrum is tilted backward and we have the so-called flat back, the treatment is either supporting or manipulatory, according to the severity and the chronicity of the particular case.

In acute but mild cases, both in men and women, the greatest possible relief is given by properly strapping the back. An adhesive strap should be placed going across the buttocks, after the buttocks have been thoroughly compressed—preferably by an assistant—from one trochanter to the other. These straps should be only about three inches in their perpendicular width, and should be placed opposite the third sacral segment. Care must be taken that the straps are kept well below the crest of the ilium. They should not extend in front of the trochanters. This will relieve the mild acute forms of the affection.

In cases of more chronic type, a more permanent brace should be worn for several months. In males this can be done by a surcingle belt, made of buckskin, about $2\frac{1}{2}$ inches in width, which should firmly encircle the pelvis, on a level with the third sacral segment. In cases of males with a large and fatty abdomen, a brace similar to that described for cases when the sacrum is tilted forward may be used with much benefit.

In women the corset may be utilized as a support for a webbing belt which is to go around the pelvis; or a sacral pad, made of steel and padded, which gives pressure over the sacrum by its steel prolongations, may be incorporated into the corset.

In those cases in which the sacrum is tilted backward—both in males and females—which have resisted these mild measures, or in severe cases in which the pain is very great, the manipulatory treatment is the method *par excellence*. It is to this method that Baer wishes particularly to call attention.

We all know of cases of so-called sciatica, painful in the extreme, which have re-

sisted all therapeutic and surgical treatment for months and months, and cases of chronic invalidism, with constant pain in the thigh and an associated limp. Or we have seen big, strong, healthy men, hardly able to drag themselves into the office or clinic, so great is the pain and disability. These are the cases which respond immediately to manipulation, to the delight of the operator and to the joy of the patient. Baer has manipulated 100 of these cases, with immediate relief in almost every case, and with a relapse in only three. The procedure is as follows:

The patient is placed on a low, non-movable table, flat on his back, and then anesthetized. The anesthetization should be carried to the point of complete relaxation of all muscular tissue, for the force to be exerted at times is great and muscular rigidity carries with it some danger to the patient.

While an assistant holds the pelvis firmly, the operator grasps the calf of the leg and flexes the fully extended limb. The hamstring muscles are found to be in a state of spasm. They are attached to the tuberosity of the ischium at their proximal end, and to the head of the tibia and fibula at their distal extremity. As the fully extended leg is flexed on the thigh, the hamstring muscles pull on the tuberosity of the ischium and the top of the ilium backward to meet its sacral junction. This procedure of stretching is carried on until the hamstring muscles are thoroughly relaxed, a condition which is indicated by the fact that the fully extended leg can be flexed to a position far beyond a right angle; indeed, the dorsum of the foot almost touches the shoulder. A definite click is often heard during the manipulation, which some have thought to be due to the replacement of the misplaced sacroiliac articulation. Of this, however, Baer is not convinced, for it has seemed to him that the click is to be heard and felt by a slight subluxation of the head of the femur as it pushes against the hamstring while the leg is in extreme flexion. The presence of the click is always synchronous with the relapse of the hamstring

muscles and indicates that the work has been accomplished. If one now looks at the back, one finds that the flat back has been replaced by one with a normal lordosis. Care should be taken in manipulation, for it is quite conceivable that, with careless handling, one may cause a subluxation of the knee-joint back causing a paralysis, or that one may cause a fracture of the head of the femur. Only two complications which have occurred in Baer's series of 100 cases have been mentioned, one case, the setting up of a phlebitis, and in the other, owing to inability to make a proper diagnosis, the production some weeks later of a cutaneous abscess springing from the iliac joint. After the manipulation has been finished, the patient should be placed in a Goldthwaite frame, and put up in a dressing extending from the nipple down to the knee on the affected side. This is done to preserve the lumbar lordosis which has been obtained by the procedure.

The patient is allowed to remain in the cast in bed for a period of ten days. A small pelvic strap, as indicated for mild forms, is worn as a preventive measure for the next two months.

Baer knows of no class of cases in which the results obtained are so pleasing, both to the patient and his physician.

CHEMOTHERAPY IN TUBERCULOSIS

LEWIS in the *American Journal of Medical Sciences* for May, 1917, states the accomplishments of the laboratory to the present in the endeavor to combat tuberculosis from the chemotherapeutic point of view can be summarized in a sentence: there has been built up a series of substances which in the test-tube are capable of restraining the growth of the tubercle bacillus in marked and measurable specific degree, and which when introduced into the living tuberculous animal are capable of penetrating to the center of the masses of diseased tissue.

Attractive as may be the plan by which these substances have been reached

would still be only the happiest accident if their further qualities were such as to render them active against the progress of tuberculosis in the animal body. Neither would the failure of two such substances mean that the idea is fruitless. For the present, therefore, their efforts in the chemical laboratory are directed toward increasing the number of substances possessing these (as it seems to them) fundamentally desirable qualities. They have also turned themselves seriously to the testing of the possibilities of these substances and their relation as therapeutic agents. The latter phase of their work is scarcely begun, and Lewis will pass it by with but few words.

Drawing on the literature for precedents he cites the following studies as the most striking of the available examples:

1. Koch and his pupils in repeated experiments during the years 1890-1897 demonstrated that by the use of tuberculin the life of guinea-pigs infected with considerable amounts of pure cultures of the tubercle bacillus could be definitely prolonged. These tuberculin experiments are worthy of the most serious consideration. The same result was reported by a number of different observers at the time, and Lewis finds no contradictory experiments. The exact chemical nature of tuberculin has never been determined, and it is to be presumed that its action comes within the field of immunity reactions rather than that of chemotherapy. Lewis has included this substance in his discussion because he believes that the results with it are the best available standard on the basis of which the value of other results may be estimated.

2. Von Linden in 1912 and again in 1915 presented tables showing that by the use of compounds or mixtures containing copper; or copper and methylene blue; or copper, lecithin, and cod-liver oil as a salve, with or without the separate administration of iodized methylene blue, the life of the tuberculous guinea-pigs could be prolonged. The results as presented compare favorably with those gotten earlier with tuberculin, but in no way surpass them. Attempts to repeat some of the experiments by Corper

in this country failed, and Selter abroad has denied their significance.

3. Certain tables published by DeWitt (1914) may be interpreted as evidence that copper and mercury compounds (or salts) of trypan blue can act favorably on the progress of tuberculosis in guinea-pigs, although the author does not put forward any positive claim for them. DeWitt has since stated publicly that she had obtained more definitely favorable results with a mercury compound of methylene blue.

4. Koga (1916) believes he has attained results of value with a compound containing copper and cyanogen. On the face of the evidence again, this substance produces a result comparable to tuberculin, but not surpassing it.

5. In the case of the two substances whose development in their hands Lewis has described above, the one, that made by condensing formic acid with Niagara blue, has done only harm in guinea-pig experiments so far. In this it corresponds to Niagara blue itself. The diazo creosote compound seems in preliminary experiments to be capable of extending the period of life of infected guinea-pigs in certain instances. The percentage of animals favorably affected in any series is less than in the tuberculin experiments of Koch's coworkers.

Those critically inclined need not search far in the original accounts given of any of these experiments to find ground for denying that they are of significance. Such criticism has been offered and will certainly be continually forthcoming. In so far as attempts have been made or are being made to introduce any of these substances into the practice of medicine, any amount of skeptical opposition is in Lewis's opinion fully warranted. In 1890 it was quite justifiable to take the first favorable results obtained in the laboratory and make careful clinical trial of tuberculin. We should, however, profit by this experience and proceed with great caution in the clinic until the evidence shows that new substances are distinctly better than tuberculin experimentally.

In the interest of scientific progress, on the other hand, all of these results should be treated with great charity. In view of the purely statistical nature of the inquiry, the experiments must be repeated a number of times before they are finally accepted as evidence, but it must be remembered that a single failure has no more interest than a single success. If it be granted as a probability that some measures of the truth may lie in these observations, the future of chemotherapeutic studies in tuberculosis is not discouraging. At this stage of development the possibilities compare favorably in this particular case with those which offered for the broader subject of chemotherapy when Ehrlich was first able to cure trypanosomatous mice with trypan red. Several substances seem now to be known which are capable of giving a slight advantage to the host in its contest with the parasite. This number must be multiplied by empirical research through known chemical compounds, and each such substance showing a suggestive lead must be subjected to carefully considered chemical manipulation to develop to the full its latent possibilities. Each year of the five that Lewis has been actively engaged in this work he has seen some added idea or suggestion of real value, and we may be sure that if in the future faith is expressed in continuous experimentation and confidence is put in evidence by financial support adequate to the size of the task in hand the desired results will be achieved.

THE TREATMENT OF GOITRE BY THE ROENTGEN RAYS.

In the *Interstate Medical Journal* for April, 1917, BOGGS writing on this topic states that the principal treatment should be directed toward the thyroid, but in many cases the thymus should also be rayed. Do not depend on raying the thymus alone, omitting the thyroid, unless it is where the thymus is greatly enlarged.

The treatment of goitre is major roentgenological work, and should not be at-

tempted by any one unless he is familiar with his technique and knows the physiology and pathology and needs of the ductless glands. A decrease in the pulse-rate and an increase in weight are the first improvements noted. Reduction of the thyroid is not always marked when all symptoms have disappeared, and the ophthalmos is the last to show improvement. Sufficient results have been produced to give all cases a fair trial; nothing is lost and many operations will be avoided. If the patient is greatly relieved after the first series of treatments, one must consider the patient cured at this stage.

It is to be expected, if it is necessary to operate, the mortality will be lessened by preliminary roentgen treatment. The aim is to cause sufficient atrophy of the thyroid so that it will produce a healthy amount of secretion and no more.

THE TREATMENT OF ARTERIO-SCLEROSIS.

STONER in the *American Journal of Medical Sciences* for May, 1917, says that these patients must not be treated at the expense of their well-being. It requires an extreme tact in rightly managing them, there is a tendency to live around the blood-pressure and become very introspective. Immediately they regard themselves candidates for apoplexy. They very quickly label themselves as high blood-pressure victims and become intensely neurotic. The blood-pressure estimations must always be favorable to their improvement. Honestly can we say that blood-pressure is a very changeable thing; that its determinations can never be made definite; that the means of estimating are only approximate at best; that blood-pressure is a minor thing; that the condition as a whole is of chief concern. It is our duty to take the patient from all strenuousness of life and discipline him in a régime which is favorable to improvement, for after all the problem is one of management rather than of a particular drug. We must restrict the diet particularly in respect to meats, condiments

stimulants, sugars, and fats. If obese, the cardiovascular mechanism will be relieved by reduction in weight. Many patients are greatly improved in subjective symptoms, such as dyspepsia, cardiac pain, and fatigue, on reduction of weight, which gives a corresponding and often disproportionate reduction in blood-pressure. In severe cases with obesity reduction may best be managed by rest in bed over a period of months.

Overeating, directly or indirectly, is a factor of no small importance in producing cardiovascular disease, be it due to putrefactive substances from the bowel or overtaxing of excretory organs by unused food material. Stoner does not enter into a detailed discussion on a dietary, as certain principles in feeding are to be observed with which we are generally acquainted, and the problem is more or less an individual one. Just how much or how little salt may be given in an individual case is often speculation. However, we knew that withholding salt in cases with edema or pre-edemic states gives encouraging results. Careful dietary, management, and well-regulated exercise will do much in the early cases of hyperpiesia, and no kind of exercise is better than walking. In the more advanced cases a period of rest in bed is essential, with warmth, passive exercise, and baths. A mild and equable climate with moderate elevation is desirable. Excessive hot baths are generally not beneficial and do not give substantial relief, and may give the patient discomfort. The desirable bath seems to be neutral at about 33° or 34° C., and gradually brought to 40°. Nearly all baths affect the cardiac mechanism and should be given cautiously.

The advantages of treatment aside from careful regulation of diet, encouragement of elimination, and gradation of activity are probably overestimated. Authors disagree on value of warm or hot baths, but the tendency is to get away from the hot bath. The quantity of water taken depends upon the individual case; but speaking generally the liquid intake of the hyperpietic case should be restricted to 1½ or 2 liters daily. The radium bath (natural water) has be-

come popular in the management of these cases. It is claimed that it lessens viscosity of blood, increases diuresis, and encourages uric-acid elimination, and hence lowers blood-pressure. Electric-light baths have been advised, but should be used in the same careful way as tub baths, starting at lower temperature and gradually increasing to 90° or 100° F. Electricity in the way of high-frequency currents is advised by some and discouraged by others. Stoner believes the consensus of opinion is that it lowers peripheral resistance and, of course, lowers pressure.

Venesection is of value in the high-tensioned case, is of value in warding off a crisis, and may be repeated at intervals in certain selected cases. It is a very simple procedure by placing a towel as a tourniquet above the elbow, tapping the space at the bend of the elbow to bring out the vein, scrubbing with alcohol, and inserting a needle of sufficient lumen to permit a free flow, which is encouraged by having the patient alternately close and open his hand. Bleeding is contraindicated in cases of high pressure, with kidney involvement, when there is a degree of anemia. The blood-pressure is lowered for only a short period, but a sense of relief is experienced from the pressure symptoms. It is contraindicated in the decrescent form with low blood-pressure.

In treating blood-pressure we must appreciate that the process is largely compensatory, and our interference should be cautious. Therefore, in so far as vasodilator drugs fail to relieve a cause as a toxin we must consider how much lowering of pressure in this way brings about good. However, if our experience teaches us that symptoms can be relieved and the patient be given no hazards, symptomatic treatment is justifiable, and so long as we are unable to prove that their high pressures may be due in part at least to toxin irritating the vasomotor center, it seems quite rational to give vasodilators, such as nitrites, even over an extended period of time, if pressures are lowered and the patient is made more comfortable without untoward signs, such as

edema or a failing myocardium. Nitroglycerin in drop doses has a definite place in relieving cardiac or anginoid pains, and Stoner not infrequently places it in a patient's hands to be used cautiously when indicated. Just how so-called vasodilators act is speculation. It is accepted that diastolic pressure is lowered, and the question is whether by peripheral dilatation or splanchnic dilatation or by lowering cardiac energy. We should watch not only our systolic but diastolic pressure when administering such drugs. At best, drug therapy is only an adjunct to the treatment of these cases. Mercury is employed, but in the non-syphilitic case Stoner has had no experience. Iodides unquestionably have value if given intensively over a period of time with alkalis, even though animal experimentation is to the contrary, but we cannot compare normal with abnormal arteries. Just how is speculation, whether by lessening viscosity of the blood, by lessening spasm, or by excitement of the thyroid.

NOVARSENOBENZOL AS A SUBSTITUTE FOR NEOSALVARSAN.

TAYLOR in the *China Medical Journal* for March, 1917, states that during the two months, June and July, 1916, when the drug could be procured by him, he gave fifty-six intravenous injections of the new French preparation novarsenobenzol. From a clinical standpoint these cases have been highly satisfactory. As yet his laboratory is not equipped for performing Wassermann reactions, but he hopes soon to be able to make this test in order to study more thoroughly the real efficiency of this new substitute for neosalvarsan.

His method of intravenous injection is as follows: Into a clean, sterile, white bottle, with rather large mouth, 100 Cc. freshly distilled water is poured. (The bottle has two marks scratched on it with a file, one at 100 Cc., and one half-way between, at 50 Cc.) After the vein is dissected out and ligated distally (this is unnecessary—Ed.) the novarsenobenzol is

poured into 100 Cc. of the distilled water in the bottle. The yellow powder goes into solution immediately, and the mixture can be injected at once, being perfectly non-irritating in reaction. First, a little normal salt solution, made from chemically pure sodium chloride, is allowed to run into the vein from the long glass tube. Before this is entirely run out the novarsenobenzol solution is poured in, and this in turn is followed by more salt solution poured into the same tube by an assistant. By this simple procedure only one glass tube is necessary, and the drug to be injected into the vein is both preceded and followed by a non-irritating salt solution.

In all his fifty-six cases he injected the drug into patients at a time, using 50 Cc. of the salt solution for each patient. In this way the first dose was 0.30 gramme. The two doses were always prepared at the same time by two separate operators, and with separate sets of instruments.

The temperature of the distilled water in which the drug is dissolved must be between 68° F. to 71° F.). The mixture can be set aside after it is made as it oxidizes very rapidly, forming poisonous by-products. It must be given at once. (In one of his packages one bottle had been broken. The contents had almost entirely disappeared, leaving a small black residue.)

In this series of cases, giving 0.30 gramme as a dose, there were only two unpleasant reactions. One patient vomited while the solution was running into his vein, probably a psychic effect, and in the other the temperature was 104° F. four hours after injection. As the latter patient had sacroiliac tuberculosis, with a sinus, it is possible that the fever was due to the tuberculosis and not to the drug injection. In all the other cases there were no symptoms due to the injection other than the slightly chilly sensations following the injection.

Every case showed improvement after the first dose, and some were startling in the rapidity with which they cleared up. The most rapid results were in cases of well-marked secondary rashes. Some

These very violent rashes seemed to fade away over night, and be entirely gone from the third to fifth day. The cases with joint pains also improved quickly after the first injection.

There were three cases with extensive tertiary lesions; one of the scalp, and two of the legs, which had resisted mercury and potassium iodide for nearly a year. These improved rapidly in a few weeks after each had received two injections of novarsenobenzol.

There were also two cases of spastic paraplegia, which rapidly improved after two injections. One patient who had been brought in on a stretcher was able to walk out of the hospital after two weeks. The other could sit up when he left the hospital, although when he came in his condition was one of extreme spastic paraplegia. He was instructed to continue taking potassium iodide and mercury inunctions, and to return in three weeks for a third injection, and later for a fourth. It will probably be necessary to lengthen the flexor tendons of the legs in this case before they get straight again.

As yet Taylor does not know how much of this drug it takes to effect a cure, but in his clinical experience he does know that even one dose is always followed by some improvement, and that in 0.30-gramme doses there are no unpleasant after-effects such as violent chill, vomiting, abdominal pains, or high temperatures.

CONSERVATION OF THE HEART IN THE AGED.

In the *Medical Review of Reviews* for May, 1917, Brooks points out that as a rule the aged person, unless still required to exert a considerable amount of physical energy, desires less of the highly nitrogenous foods, and in but very exceptional cases as he found it necessary to give the meats in the amounts commonly found advisable in earlier life. This applies especially to beef, mutton, and also eggs. Vegetables, and particularly the more bulky ones, as celery, string-beans, cauliflower, cabbage,

salads, and fruits are commonly much more acceptable and certainly more desirable in these cases. The fruit juices, soups, and especially the vegetable and fish, are desirable and acceptable except in those cases in which there is a tendency toward ascites or edema.

Brooks believes that salt in most cases should be cut down to the amount actually demanded because of its very direct bearing on the retention of fluid in the tissues, which is in itself one of the most serious tendencies in the defective circulation of senility. The irritant condiments, pepper, and particularly the very hot sauces and spices, should be largely eliminated because of their irritant action in the excretory glands, and their subsequent effect on the work of the heart.

The fruits are a matter of considerable question, Brooks finds among those who should be best qualified to judge as to these dietetic matters. His own preference is to allow them freely unless there be some specific reasons for their limitation, such as for example often exist in low sugar tolerance, and again in the tendency to retain a superabundance of fluid in the body.

Sugar in some form of sweets or as sweetening is commonly much craved by old persons, and Brooks is one of those who feel that as a cardiac food, if we may be permitted to use so indefinite a term, sugar is most useful. He employs it in the usual sweetened foods, the fruits and fruit juices, as lactose, orangeade, or cereals and so forth, unless there be direct contraindication. Sugar seems to be very easily metabolized by the senile tissues, unless indeed there be a lowered tolerance for it, and it quickly gives up its energy, furnishing thus a material particularly adaptable to the needs of the defective heart.

Brooks feels very much in the same manner in regard to the use of the alcohol drinks in the same condition, unless some definite contraindication, as a renal or hepatic disease, exists, and he fully agrees with Osler in his apt statement that alcohol may be often considered as the milk of the aged.

Now as to the use of a highly milk diet in the senile heart: It has not been Brooks's experience that this is a very desirable food, certainly not in many instances at least, nor even in general. Its lime, sodium chloride, and water contents are not of particular utility in senility, and they are often of direct harmful nature. The caloric value of milk considered in relation to its bulk is not high, and its more essential properties for the aged may be given in the form of cheese, which Brooks finds is a most acceptable and satisfactory substitute for meat in every instance, where of course the digestive conditions permit its use. The cereals, or most of them, are very satisfactory foods in the ordinary instance.

The question of the use of tobacco is another point of considerable moment in a great many cases, because of the comfort which the weed gives, and the real solace of the habit in the lonely hours of old age. Brooks much regrets to say that from the cardiac standpoint he does not consider its use advisable, though one sees many cases in which it seems to be employed, even excessively, without bodily harm and often with great mental comfort.

The same must be confessed about tea and coffee; but as a stimulant, if indeed it be such, for Brooks himself prefers to consider it a quickly carbonized food, alcohol appears to him far superior than either of the others mentioned.

Although, as already pointed out, excessive strain—that is, overexercise—is to be strictly forbidden, it should be practiced to some extent, and where for circulatory reasons exercise in its customary forms is not permissible, massage or active and passive movements may be substituted.

We must not forget that emotional strain is quite as harmful, if not even more so, for the senile heart as physical stress. In defective or purely senile cases the emotions must be conserved particularly. If business worries or social responsibilities harass, they must be eliminated as far as possible. It is, however, one of the most difficult questions Brooks finds to solve for the elderly person to advise his giving up

his customary responsibilities and In many cases Brooks has found a ment from business to be followed by circulatory and mental decadence, really believes that in most cases in the mentality is retained in an ager form patients are better to continue the form of more or less their customary responsibilities, unless indeed they of that fortunate class provided with a gaging hobby which becomes a perfect substitute for work.

The long anticipated pleasure of for many senile persons is another question which we are frequently called upon to solve. May the man with a senile safely and profitably travel? This depends very largely of course on the comfort which he may be able to provide for himself in his wanderings, and to a very large extent on the places to which he wishes

CARDIOVASCULAR LUES.

GREENE in the *Journal-Lancet* of 1917, concludes an article on this topic with these views which bear on treatment.

1. The discovery of treponema perfected methods of demonstrating its body tissues, the development of the sermann and luetin tests, and careful extended studies based upon these, have resulted in an exact knowledge of the dissemination of syphilis and its enormous importance as a factor in the causation of diseases of extraordinary diversity.

2. We now know that the term "congenital syphilis" embraces a large number of diseases in which its presence was formerly only assumed or wholly unsuspected.

3. It now appears that, to an extraordinary degree, the mortality of the disease depends upon its vascular ravages, and these are proven fundamental in many of the most strikingly diverse complexion.

4. It may assume any one of the various forms of sclerosis, endarteritis, or medial degeneration, but presents in many instances in the earlier stages of the disease certain characteristic lines of attack and modes of histologic expression.

5. The most characteristic of these is the productive mesaortitis of Francis H. Welch, extraordinarily prevalent, almost constant microscopically in a more or less developed form at autopsy in every case of proven syphilis, and the actual cause of death in 50 per cent or more of such cases.

6. This disease shows a peculiar affinity for the first portion and arch of the aorta, and tends to assume at the root of that artery a characteristic line of march which in 80 per cent of the cases results in the establishment of secondary aortic regurgitation of a peculiarly progressive and intractable type, once it reaches the stage of frank myocardial insufficiency.

7. In 20 per cent of such cases of the advanced type true aneurism and frank angina pectoris major occur in about equal proportions.

8. The leading symptoms, aside from those of aneurism and actual angina pectoris, are pain, dyspnea, diffuse dilatation of the aorta, and progressive crippling impairment of the vascular reserve.

9. Many of these cases are wholly silent, and the symptom-complex may be blended, incomplete, or so misleading as to be most readily misinterpreted.

10. Only through recourse to more rational methods of early diagnosis, dependent upon the proper recognition and weighing of minor symptoms, subjective and objective, may these cases be detected early enough to render specific treatment properly effective.

11. The utmost importance attaches to the Wassermann test, but only when it is in the hands of an expert serologist.

12. The improper use of this test and the false reliance placed upon it must vitiate many reports, and result in errors of omission and commission, damaging to the physician and a source of humiliation and injustice to the patient.

13. Finally, a consideration of this topic emphasizes not only the importance of the individual cardiovascular luetic lesions, but also the terrible potency of syphilis as a cause of death at a period remote from the primary infection and through channels

which so conceal its identity as to obscure the fact that it may yet come to be called the "Captain of the Men of Death."

HEAD COLDS FROM THE STANDPOINT OF THE INTERNIST.

In the *American Journal of the Medical Sciences* for May, 1917, REILLY expresses the belief that two-thirds of the profession prescribe quinine in the early stages of these complaints, and some continue its use throughout. Certainly, there is no agent which so quickly congests the mucous membranes of the tract as quinine, and sometimes even in small doses. One can understand the homeopath prescribing small doses of quinine on the Hahnemannian principle that slight congestion will relieve intense congestion, but from any other view-point it is difficult to see the rationale of its action. There are millions who swear by it, as he supposes there were millions who vouched for the value of bloodletting, antimony, etc. Personally, Reilly has never seen any good from its use, although he has used it often and in various doses; and he has often seen harm follow its employment.

Dover's powder is still used at the onset, oftentimes with the idea of aborting the cold. Unfortunately, medicines can rarely strangle germs. It is not as popular as it used to be, possibly because more people now seem to be susceptible to the disagreeable after-effects of opium than formerly, or because of the anti-opium hysteria which has spread over the country. Reilly has never satisfied himself that its benefits equaled its disadvantages.

Acetyl salicylic acid, he believes, does relieve symptoms, and in small doses it does not congest the mucous membranes seriously. In some patients relief is undoubtedly afforded by atropine. Under the title of rhinitis tablets this medication is much in vogue. The well-known combination of quinine sulphate ($\frac{1}{2}$ grain), fluid extract of belladonna ($\frac{1}{8}$ grain), and camphor ($\frac{1}{4}$ grain) makes the practitioner feel that he is orthodox in using quinine and camphor

in treating a cold, but it is the atropine that produces the results. The dryness of the mucous membrane that follows its use causes most people, after a time, to discontinue it. In order to obtain good results it must be given early in the attack, *i.e.*, within the first twelve hours, and repeated every half-hour or so until the physiological effect is produced. Of course it does not cure the cold, but it alleviates the most prominent symptoms of coryza during the first day or two. After that the disease runs as before. It is useless in the moderate and descending types of the disease. When the profuse watery discharge is very troublesome a powder consisting of bismuth subnitrate (3 ij), starch (3 j), gum arabic (3ss), with menthol (gr. ij) or antipyrin (gr. x), may be snuffed up. This almost always gives considerable relief.

Much has been said of the use of vaccines in this complaint, but it is difficult to judge of their effect because the vast majority of the cases are in the very nature of things better before a second injection may be made. If one takes the standard laid down by Wright and his followers, who state that there is no marked improvement in the opsonic index in the vaccinated before a period of from four to seven days after the first injection, then by the time the second injection is due nature has cleared up most of these cases, so that it is difficult to decide what effect has been produced. Whether their continued use at the approach of the fall and winter season will prevent subsequent attacks is also a matter that must always be open to question, as nature sometimes herself protects. Personally, Reilly's results with vaccines, either as a curative or a prophylactic measure, have not been successful.

Practically all those who consult a physician for this complaint do not do so until after the second day of its invasion. At this time, again, the hygienic advice mentioned above should always be given. If there be much general soreness or pain, acetphenetidin may be added to the acetyl acid salicylic, but the atropine is useless. However, in these cases the local treatment

is by far the most important. It has been Reilly's habit to begin with an alkaline spray under fifteen to twenty pounds of pressure. This is always followed by free exudation of mucus. This is repeated until a mild blowing of the nose is rendered possible by muco-pus.

In very sensitive nostrils a spray of 1 per cent cocaine may be employed previously, but Reilly has rarely found this necessary. If there be much headache or pain an adrenalin spray of 1:10,000 may be employed; usually this is not necessary. Ordinarily after the alkaline spray the following spray is used: Acid carbolic, m. iij; iodine, potas. iodic., ää gr. vj; aqua q. s. ad fl. oz. ss; glycerin., ää fl. oz. ss; aqua q. s. ad fl. oz. iij. This is sprayed until it reaches the throat.

After this an oil spray is employed for about two minutes. The composition of this oil spray is as follows: Ol. camphor., mins. x; camphomenthol, gr. xx; pinus sylvestris, mins. xx; liq. petrol. q. s. ad fl. oz. iij.

All of this treatment does not cost more than five minutes when an atomizer or power pump is used.

By these measures one does not attempt to destroy all the germs but rather to reduce their virulence and provide drainage. Surgical measures in any infection, even if the infection has traveled to the lungs, in these cases are usually treated by expectorants and narcotics.

THE METABOLISM AND TREATMENT OF RHEUMATOID ARTHRITIS

In the *American Journal of the Biological Sciences* for May, 1917, PEMBERTON's article on this subject reaches the following conclusions:

1. Experiments are cited in which it has been possible to relieve patients of practically all symptoms of diffuse arthritis by a large curtailment of carbohydrate incidentally with the ingestion of such increased amounts as to make up and exceed this caloric deficit. When total food intake has been kept approx-

constant some such patients have actually gained weight while convalescing. This evidence by exclusion ascribes an injurious rôle to carbohydrate, is additional to that already published, and is corroboratory of it.

2. It is difficult to avoid the conclusion that fat, while it cannot be used with impunity in treating these cases, plays a relatively harmless rôle in marked contrast to carbohydrate. It can apparently be used in many cases to meet, more or less, the loss of weight which would otherwise ensue, and in certain selected cases to meet it entirely or even to cause the patient to gain weight.

3. The difference in the effects of large amounts of carbohydrate when ingested by normal individuals and by subjects of rheumatoid arthritis is not reflected in the carbon dioxide tension of the alveolar air under the limited conditions of the experiments.

FOREIGN BODIES IN THE EYE.

GREEN in the *Interstate Medical Journal* for April, 1917, says that in order to determine the presence of the foreign body he uses focal illumination and a magnifying glass (watchmaker's loupe is good, as it leaves both hands free; a binocular loupe is still better). Very minute bodies may easily escape detection unless the light is projected from different directions, or the patient is made to rotate his eye. Having determined the location of the foreign body, he notes whether it is surrounded by a delicate gray or yellowish ring (beginning infection). After 3-per-cent cocaine hydrochloride, or 1-per-cent holocain hydrochloride (instilled three times at two-minute intervals), he stands behind the patient, and has him rest his head upon his chest or upon the back of the chair; he then separates the lids with the fore and middle fingers of the left hand, instructing the patient to keep both eyes open (the tendency is either to close both or roll them upward) and to look at an object which he designates. It may be necessary, in or-

der to bring the foreign body perfectly into view, to have him shift his gaze a little to the right or left, or up or down. It is much easier for the patient to obey an instruction, "Look at the window-fastener," or "Look at the sash," than to look "a little" to the right or left. Definite fixation of an object also insures a much steadier globe for the operator's manipulations. The foreign body spud (Green's preference is for Wheeler's corneal curette) is insinuated beneath the foreign body, which, by the gentlest manipulation, strictly confined to the site of lodgment, is lifted out.

A careful search should then be made to see whether there is any unremoved particle; often, in the case of cinders or emery particles, the bed of the foreign body contains a brown ring of charred tissue. It is very essential that this also should be curetted out. To define exactly the area denuded, a single drop of a 2-per-cent solution of fluorescin (potassic fluorescein) is instilled, and the patient instructed to close his eyes for a few minutes. The excess solution is flushed out with 2-per-cent boric solution. It will be found that the corneal area denuded of epithelium is stained brilliantly green, the rest of the cornea and conjunctiva showing no discoloration. A toothpick, or match sharpened to a fine point, is dipped in tincture of iodine, the excess gotten rid of by gently shaking the pick as one would shake a clinical thermometer, and the iodine-soaked end brought into contact with the denuded area. In a case suspected of beginning infection pure carbolic acid should be applied in the same manner. As an applicator a toothpick is much superior to a metal probe, for the reason that the wood fiber absorbs the solution and the minutest quantity (a small fraction of a drop) can be applied with precision directly to the area; there is no tendency to spread beyond the point intended. The eye is then flushed out with 2-per-cent boric solution. A small quantity of White's ointment (bichloride vaselin, 1:3000) is inserted in the conjunctival sac and the eye sealed with an "occlusive dressing." By an "occlusive dressing" Green

means one that will effectively debar the inquisitive fingers of the patient from gaining access to his eye. The dressing that he uses is made as follows: A round of cotton, 2 inches in diameter, is dipped in bichloride (1:3000) and wrung dry; this is placed over the closed lids and patted down to conform to the contour of the lids; a small ball of dry cotton is placed over this, and the whole held in place by a round of gauze, which is pasted to the forehead, temple, cheek and nose by flexible collodion.

Every one's tendency is to finger a body wrapping and especially an eye bandage. Recipients of foreign bodies in the eye often return to their foundries or factories to report, and there the surroundings are anything but clean. The amount of grime that an eye dressing may acquire superficially in twenty-four hours is often surprising, but it is certainly comforting to feel assured that, so long as the ring of collodion holds intact, there is no chance for extraneous dirt or infection to find its way into the eye. If the fluorescein staining reaction is present at the first dressing the occlusive dressing is reapplied for another twenty-four hours.

To recapitulate, the steps to be followed are: (1) cocaineization; (2) clean removal of the foreign body; (3) topical application of tincture of iodine or pure carbolic acid; (4) insertion of bichloride ointment into the conjunctival sac; (5) occlusive dressing. This routine will effectively guard against extraneous infection and recurrent corneal erosion, which sometimes follow the open method of treatment—i.e., without bandage.

One possible source of infection should be borne in mind—e.g., a chronically infected lacrimal sac. Some of these sacs are painless, and give their possessors little concern save for the overflow of tears. An eye adjoining such a sac is always in peril; a corneal abrasion usually becomes infected, and then we have the picture of the so-called "serpent ulcer," which may lead to perforation and complete destruction of the eye. In the presence of this complicating

factor, ophthalmic consultation should be promptly secured. In the meantime the dressing should be left open, and, as a prophylactic measure, should receive every 12 hours 2 drops of a 1-per-cent or 2-per-cent solution of ethylhydrocuprein hydrochloride (now unhappily unobtainable on account of the war) which has a specific action on the pneumococcus, the organism responsible for chronic inflammation of the lacrimal sac.

TOXIC SYMPTOMS AFTER THE USE OF BISMUTH PASTE.

In the *Lancet* of April 14, 1917, H. WORTH makes an interesting report on this important subject. In view of the increased use of bismuth paste and its value in the treatment of infected wounds, he publishes the results of an investigation into a number of cases suspected of poisoning which have occurred in the wards of the Wharnccliffe War Hospital, Sheffield.

Five men have been found to show symptoms suggesting plumbism, and all were under the care of different surgeons. In different wards they are alike in symptoms, from severe septic wounds, and in that all were treated by the application of bismuth and iodoform paste (B. I. P.) according to Professor Rutherford Morison's technique. This paste has been in use here from September, 1916, and has been being used. The method was very recently demonstrated to Hepworth by Professor Morison in November, and has been found to be very beneficial.

Up to November 3, the paste was prepared from bismuth carbonate, which was afterwards tested, and no lead contamination discovered. After November 3 a lot of bismuth subnitrate was used instead of Professor Morison's formula; this lasted for about four weeks, and among the cases treated during this time it was found that those suspected of poisoning occurred. Unfortunately, the subnitrate was not tested before the symptoms had been noticed, and the drug was therefore not analyzed.

the beginning of December, both bismuth carbonate and subnitrate have been used, and both have been examined and declared lead-free by Staff-Sergeant F. C. Thompson, R.A.M.C. The method of testing is added to this report as a separate note. The drug was obtained from the base medical stores at York.

In this report seven cases are included, all of which were treated by the Morison method; they represent all the most severely wounded and most septic cases treated with the bismuth paste at that time. Many slighter cases were similarly treated, but none showed poisoning. Of the seven

less noticeable but still distinct "blue lines"—Sergeant R., Private B., and Private D.

Anemia was present in all seven cases, and disappeared as the wounds healed. Constipation was especially noticeable in Private Y. Both symptoms are so common among men with severe wounds that they are of little diagnostic value. No neuritis, wrist-drop, colic, or headache has been noticed. Mental stupor was a troublesome feature in one patient (Private D.), but had been developed before his treatment with bismuth paste.

Loss of sphincter control, delirium, and sleeplessness continued for two or three

DETAILS OF CASES, INCLUDING THOSE WITH TOXIC SYMPTOMS AFTER USE OF BISMUTH PASTE.

—	Disease.	Date of wound.	Severity and character of wounds.	Date of operation and application of B. I. P. P.	Date of symptoms.	Severity and character of symptoms.
Pte. Y.	G. S. W. both legs. Double amputation in France.	July 7, 1916.	Large granulating flap wounds at level of knees.	Double re-amputation, Dec. 5, 1916.	Dec. 16 onwards.	On Dec. 16, 1916, complained of sore mouth; had broad blue line on gums and cheeks Dec. 20. Constipation; no colic; anemia. Wounds healed by Dec. 30.
Pte. D.	G. S. W. left thigh. G. S. W. left foot. Comp. fract. of femur and tarsal bones.	Aug. 6, 1916.	Both wounds severe. Much suppuration. Fractured femur in bad position.	Nov. 17, 1916.	Dec. 20.	Blue line on gums, Dec. 20. Mental stupor on Dec. 1, but had been difficult to manage and stuporous to less extent during early part of November. Anemic all the time. Wounds healed by Jan. 7, 1917.
Pte. M.	G. S. W. left shoulder. Fract. of greater tuberosity of humerus. Joint involved.	Oct. 25, 1916.	Wound pouring with pus. Temperature 103° every evening.	Nov. 12, 1916.	—	No toxic symptoms. Steady improvement.
Pte. B.	G. S. W. right thigh. Comp. fract. femur. G. S. W. left wrist.	Nov. 10, 1916.	Septic wounds. Femur comminuted.	Nov. 27, 1916.	About Dec. 20.	Well-marked blue line on gums. Anemic (but was so before operation).
Sgt. R.	G. S. W. right shoulder. Fract. of greater tuberosity of humerus. Joint infected.	Nov. 13, 1916.	Deep wound tracking behind joint, and under scapula. Septic.	Nov. 27, 1916.	About Dec. 20.	Pyorrhea alveolaris, with thin blue line on gums. Transient anemia.
Pte. J. B.	(a) G. S. W. left buttock. (b) G. S. W. left thigh. Comp. fract. femur. Knee-joint infected.	Nov. 16, 1916.	Infected, but well treated by Carrel method. Bone projecting into suprapatellar pouch of knee.	(1) Nov. 27; (2) Dec. 14.	Dec 4 and later.	No blue line on gums. Delirium; sleeplessness; high temperature; loss of control over sphincters. All these symptoms were considered to be due to septic infection.
Pte. H.	G. S. W. right thigh. Comp. fract. of femur.	Sept. 15, 1916.	Track through thigh from side to side. Septic. Bone comminuted.	Oct. 27, 1916.	Nil.	No toxic symptoms. Progress in this case was much better after the use of the bismuth paste. He had shown practically no improvement previously.

cases, five had symptoms of poisoning, and two were free.

In the accompanying table, which gives details of the cases, it will be seen that four patients developed a blue line of the gums. This was first noticed in Private Y., who complained of a sore mouth ten to fourteen days after his operation, and was found to have a broad band of bluish pigmentation inside the cheeks, and on the sides of the tongue, as well as an unusually thick line on the gums. Other patients were then examined, and three more were found with

weeks in the case of Private J. B., who was extremely ill and thought to be dying. His infection was severe and his knee-joint was involved. Improvement followed, not directly after amputation, but as the suppurating amputation wound cleaned up. His symptoms, therefore, may have been due to plumbism, but are much more likely to have been caused by septic intoxication or iodoform poisoning.

Blood changes were looked for by our pathologist, Major A. E. Naish, R.A.M.C. (T.), but no granules were found in the

corpuscles. The urine was also examined for lead, but no trace found in any case.

Opinion was, at first, strongly in favor of the view that the symptoms in these patients were due to lead absorption, especially as the cases occurred while one particular batch of bismuth preparation was in use. But in Sir Thomas Oliver's book on "Lead Poisoning," p. 135, it is stated that "A blue line on the gums, with difficulty distinguished from that caused by lead, may be observed in persons to whom large doses of bismuth have been administered by the mouth; or who, as the subjects of empyema, have had injected into the fistulous tract in their thoracic wall bismuth emulsion."

And in these cases, with the exception of the "blue line," no typical symptoms of plumbism had been present, although with so intense a blue line as occurred in the patient, Private Y., other symptoms might reasonably be expected to occur. In view of the importance of a correct diagnosis it is very unfortunate that none of the bismuth preparation used in treating these particular cases was obtained for chemical examination.

Method used for detecting a trace of lead in bismuth carbonate or subnitrate by Staff-Sergeant F. C. Thompson, D.Sc., R.A.M.C.: The usual tests for lead are useless. When dissolved in nitric acid, lead can be precipitated as PbO_2 on the anode of an electrolytic cell, while bismuth goes to the cathode. The following method, which is simple, very delicate, and requires no special apparatus or skill, has been worked out for the purpose:

Dissolve 5 grammes of bismuth compound in 10 Cc. of concentrated hydrochloric acid. Dilute until bismuth oxychloride is just precipitated and redissolve in a few drops of HCl. Filter if necessary through a dry funnel into a dry beaker. Add 3 Cc. concentrated sulphuric acid, cool, and add an equal bulk of alcohol, and put aside. 0.07 per cent Pb gives a milkyiness in about five minutes; 0.02 to 0.03 per cent Pb gives a faint milkyiness in about four hours.

INTRASPINAL MEDICATION IN THE TREATMENT OF SYPHILITIC DISEASE OF THE NERVOUS SYSTEM.

GAINES tells us in the *Medical Record* of June 16, 1917, that his experience in intraspinal therapy extends over a period of three years. His preference has been for the Swift and Ellis method, and the results obtained in approximately 100 injections as compared with other methods in a total of 70 cases of neurological syphilis have led him to conclude that in intraspinal therapy carefully and properly administered we have a safe and valuable means of combating cases of neurological syphilis—cases which frequently respond to no other method.

The type of case which is benefited is first of all the early case of no matter what type. As a rule, those showing meningeitic involvement, as evidenced by high cell count and globulin content, have a better prognosis. The majority of the responses to Gaines's inquiries consider paresis the least amenable to treatment, with the notable exception of Cotton, who has had a very large experience with this disease, and whose optimistic opinion concerning it is entitled to corresponding consideration.

All agree that intraspinal therapy is practically free from danger, when due care is exercised in the preparation of the serum, in the technique of the administration, and in the after-care of the patient. Fully 10,000 intraspinal injections have been given by those quoted in this paper, and only two or three unfavorable reactions have occurred.

There are now in vogue three principal methods of intraspinal therapy: the Swift-Ellis method, the Ogilvie method, and the use of mercurialized serum. Each method has its advocates, but the general trend of opinion seems to be in favor of the Ogilvie method. Good results are being obtained by all methods. The method of intraventricular therapy using serum prepared by Ogilvie's technique is reported only by Cotton and used by him in paresis. This

method should merit much interest and promises unusually good results.

The question of when to use intraspinal therapy is of importance. Many of those quoted in this paper use it in cases of neurological syphilis when other methods fail. Others, including the writer, feel that valuable time may be saved in using the method from the beginning, especially in tabes and paresis, while in cerebrospinal syphilis, intravenous salvarsan, mercury, and potassium iodide may first be tried.

What influence has intraspinal therapy on serology? Provided the method is used early and energetically and frequently, the four reactions may be rendered permanently negative. In many cases, however, the Wassermann remains positive, though the cell count and globulin content are reduced to normal. Even in the presence of a positive Wassermann there is frequently clinical improvement or apparent cure, while in the serologically negative cases there is corresponding clinical improvement.

It has not been recognized until lately the importance of long and frequent treatment in syphilis generally, but especially in neurological syphilis. Noguchi has shown that salvarsan is far more effective if given in a series of rapidly repeated injections than if given at long intervals, in which case there is developed an actual resistance to the drug. Those with the most extended experience now advocate intraspinal injections, every one to two weeks, or the intravenous injections once or twice a week, until the four reactions become negative. One should not conclude that a case is Wassermann-fast until after a prolonged trial of from 10 to 20 injections.

Finally it must be emphasized that the early cases are the hopeful ones. Dead tissues cannot be revived, but cases in which the disturbance is due to inflammatory reactions in the central nervous system, especially where the meninges are bearing the brunt of the infection, are those in which brilliant results may be expected.

THE CONTINUOUS BATH IN MENTAL DISEASE.

In the *Journal of the American Medical Association* of June 16, 1917, STRECKER writes interestingly on this topic. He says that perhaps the fact that the continuous baths were first employed in mental disease and have found their most general application in this field has led to their neglect in the treatment of certain other conditions, which, although not generally classed as insanity, nevertheless present similar problems. Patients with delirium tremens, for instance, are generally referred to the general hospital, where the method in vogue is usually mechanical restraint plus hypnotic and stimulating drug therapy. Alcoholic delirium is essentially a toxic psychosis in which the psychomotor excitement, although more intense, does not differ materially in its characteristics from that of the deliriums of certain fevers, of high-grade infective-exhaustive states, and of so-called "delirious" mania. There is, in all, the same imperative need of rapid and free elimination to reduce the toxicity, and sleep to prevent exhaustion. Hypnotic drugs not only are frequently ineffective, but if they are to succeed at all, must be given in large and dangerous doses. At the Boston Psychopathic Hospital, ten unselected patients with delirium tremens were treated in the continuous tubs with the addition of moist packs and eliminatory measures, without a single fatality. Fifty cases selected at random in series of ten from five general hospitals, in which the method used consisted of mechanical restraint, hypnotic and stimulating drugs, showed a mortality of 26 per cent. In this connection it may be remarked that in several instances Strecker has found the prolonged bath a valuable adjunct to the Lambert-Towne treatment of narcomania in helping to combat the marked restlessness, which commonly makes its appearance on the second day.

On the family physician, who generally first sees the acute mental case, devolves the exceedingly difficult problem of caring

for the patient during the longer or shorter interval which precedes admission to the hospital. Certain of the objective manifestations of acute insanity, insomnia, motor restlessness, and vocal activity appeal to the laity in the light of fundamental disorders of the mind, and there is a naive but insistent clamor for an immediate exhibition of the magic hypodermic which will soothe the troubled spirit and produce sleep. The physician cannot well avoid the moderate employment of hypnotic drugs, but he can limit their use by resorting to other measures. A prolonged and even a continuous bath can be safely given in an ordinary bath-tub, provided an efficient nurse is in attendance. Mental disease in itself is serious enough without the addition of a complicating drug toxemia.

A few cases of "postoperative mania" suggest that continuous bath treatment is frequently a practical method of caring for the surgical patient who develops acute mental symptoms. If there is actual danger of mechanical violence to the wound, the principle of non-restraint may have to be sacrificed as the lesser of two evils. The active, untidy surgical and mental patient is under infinitely better conditions in the bath, in which comparative asepsis can be maintained without great difficulty, than when confined to a room in which even the most diligent care cannot prevent a septic environment. The bath has been repeatedly recommended for the decubitus which is often a serious feature of the late stages of paresis. Strecker has seen an obstinate ulcer of the foot on which the usual medication, and even repeated scarification, made no impression yield readily to a continuous bath of physiologic sodium chloride solution.

Perhaps the principal disadvantage of the baths is their cost, both as to installation and operation. Furthermore, the intensive nursing required is a matter of considerable expense. Careful and intelligent care, before, during, and after the bath, is the only certain method of avoiding accident and of realizing the fullest possi-

ble value of the treatment. Probably if the amount saved under the conditions of the bath, in caring for the untidy and destructive patient, could be computed, the importance of these factors would be materially lessened.

It seems conservative to assert that the continuous bath is the most satisfactory method we have of treating the fairly large group of excited states which are encountered in many of the psychoses.

THERAPEUTIC USES OF RADIUM.

HAZEN in the *Virginia Medical Semi-Monthly* of June 8, 1917, expresses the belief that radium may be expected to influence favorably a low vitality of body tissue exposed to it, this devitalized condition being congenital, or acquired by infection, injury, or senility. It may be expected also to favor the destruction of new growths by overstimulation or by selective action. We are justified in believing there is such a thing as "selective" action, whereby normal cells have their resistance increased and pathological cells are at the same time favorably affected.

The skin and mucous surfaces are those structures which are most likely to be within reach of this therapy; the areas thus treated will necessarily be small on account of the rarity and costliness of the agent. For this reason, other methods, as the x-ray, will often be more available. The destruction of small skin growths is well within the practicable range of this therapy; and the shrinking of circumscribed tumors, like fibroids of the uterus, can be undertaken with fairly large quantities of radium.

The London Radium Institute reports that warts and papillomata yield readily to short exposures; cavernous nevi do well; keloids give excellent results; the treatment is of use in lupus vulgaris, and lupus erythematosus often responds favorably; leucoplakia patches are speedily removed, but tend to recur; carcinoma of breast, uterus, rectum, show a favorable influence,

but "cure" should not be spoken of in this connection; in fibroid conditions of the uterus there is a most beneficial action upon the distressing symptoms, menorrhagia and metrorrhagia.

The reports from the New York Skin and Cancer Hospital would indicate the same general findings. Dr. W. S. Russell, of that institution, quotes the workers in the Paris Biological Laboratory and the London Cancer Hospital to the effect that operation is safest in early cancer, and radium is a useful adjunct following operation.

THE TREATMENT OF GOITRE.

In *Northwest Medicine* for June, 1917, MOORE states that in presenting his paper he lays no claim to originality, but wishes to relate his experience with a method that has proven very satisfactory, and to present this treatment in concise form, its advantages and disadvantages, stating in a practical way the classifications of thyroid diseases that respond to it and suggesting a rational method of treatment for those that are not benefited by it.

It is to be hoped that in the near future some one of the many research workers will isolate the actual cause of endemic goitre. That the disease is becoming more prevalent no one can doubt, and until the actual cause is known, treatment must of necessity be empirical. Whether the disease is caused by some infective organism or by some specific bacteria we do not know, but that drinking-water carries the active agent is the consensus of opinion of investigators. Assuming that the disease is caused by an infection, the method of treatment as outlined later is taken from the realm of empiricism and may be classed as a specific.

Whatever the nature of the active organism, we know that boiling or distilling drinking-water renders the same innocuous. This, then, is the first step in the medical treatment, and in simple non-toxic goitres of adolescence this alone is sufficient to cure.

Should the enlargement not disappear under this treatment, the Gunn method should then be used. This consists of the use of iodine externally and internally for a period of not more than four weeks. The iodine is then stopped and a 5-per-cent phenol solution is injected into the gland substance, one or two injections of 60 to 100 minims being usually sufficient to effect a permanent cure.

One should keep close watch of the patient while she is taking the iodine, as a non-toxic goitre may become toxic from the use of iodine. Moore had one develop an exophthalmos with marked nervous and cardiac symptoms, which was relieved only by rest in bed, quinine hydrobromate and ergotin internally until the toxic wave had subsided, when about five-sixths of the thyroid was removed.

Simple hyperplastic non-toxic goitres yield readily to treatment. This is the class that is very common in young women from eighteen to thirty years of age, who are very grateful for the non-disfiguring removal of an annoying blemish.

In hyperplastic toxic goitres use iodine very carefully and for a short time only. Depend on rest, diet, and injections of phenol. If improvement is not marked early in the treatment, discontinue and advise operation.

On cystic goitre the treatment has little or no effect. Many of these cases respond to x-ray exposures, but as a rule operation will be necessary.

As already indicated, one must select the cases suitable for the Gunn treatment. To waste time with a markedly toxic goitre would be criminal. In such cases nothing but the early removal of a large portion of the gland is going to save the patient or prevent serious degenerative changes in myocardia and kidneys.

If the patient is seen during the toxic wave put her in bed, give no drinking-water except that which has been boiled or distilled, clean out the intestinal tract, put on meat-free diet, and give quinine hydrobromate gr. 5 and ergotin gr. 1 four times a day. Inject boiling water into the

gland if no improvement follows or if toxemia is increasing, and the heart action so bad that operation is not advisable. Tying one or both superior thyroids under local anesthesia will tide the patient over the toxic wave when she can be operated upon with comparative safety, while she surely would have died if operation had been performed during the height of toxemia.

Moore has treated a series of forty cases which include simple, hyperplastic atoxic, hyperplastic toxic, cystic, non-hyperplastic atoxic, and non-hyperplastic toxic. Eliminating the cases that were so toxic that they were operated on as early as consistent with safety, his percentage of permanent cures is a fraction over 90. He realizes that the number is too small to be of much value, yet the results were so encouraging that he will continue the treatment until he is convinced that there is a better method.

The Technique of Injection.—He uses a Record or a Luer syringe of not less than 5-Cc. capacity, to which is attached a needle two inches long of small caliber. After boiling needle and syringe, the site of the injection, usually over the isthmus, is touched with iodine. The skin is picked up with the fingers and brought well up on the shaft of the needle before inserting into the gland substance. The mass of the gland is then located by palpation, and frequently may be grasped and held while the needle is introduced into the substance of the gland. The patient is asked to swallow. If the needle is properly inserted, it will move with the tumor mass during the act of deglutition. Then slowly inject from 60 to 100 minims of the 5-per-cent phenol solution into the gland substance. The patient will have a feeling of faintness lasting about one to two minutes. The only pain is that of the ordinary hypodermic injection. There is a slight reaction to the injection, noticed by a feeling of soreness and a slight swelling of the gland. This completely subsides in a few days, and it is advisable to wait a week or ten days before repeating the injection. By measuring the neck one will notice a

continual decrease in size until all enlargement has disappeared.

Frequent examination of the urine is necessary to guard against a possible nephritis. If the gland is still enlarged after ten or twelve injections it will be useless to continue the treatment.

From Moore's experience with the series of cases he has drawn the following conclusions:

1. Hyperplastic, non-toxic goitres respond most readily to this treatment.
2. Where toxemia is present use iodine guardedly and for a short time only. If improvement is not marked early in the treatment, discontinue and advise operation.
3. On cystic goitres the treatment has little or no effect.
4. Exophthalmos cases are best treated by rest in bed, quinine hydrobromate and ergotin internally, with operation as soon as the toxic wave has subsided.

GONOCOCCUS VULVOVAGINITIS IN CHILDHOOD.

In the *American Journal of Diseases of Children* for May, 1917, GITTINGS and MITCHELL point out that the treatment of gonococcus vaginitis in children involves the use of local remedies and vaccines, and general constitutional measures. Most authors make use of some form of local treatment, some few believing that persistence in reliable technique will result in cure, although admitting that much time and patience are required. Wolff opposes local treatment in those past infancy on the score of its demoralizing influence. Rygier enlarges on its difficulties and the lack of permanent results.

Adkins believes that the disease runs its course in spite of all one can do to cure it. Certain local measures he finds of temporary benefit. Among these is the injection of suspensions of living lactic acid bacilli.

Whitehouse also has treated eight patients with cultures of lactic acid bacilli without the use of other measures. He

obtained cessation of discharge and disappearance of gonococci and septic organisms in from fourteen days to three weeks. He does not know whether or not these results are permanent, however.

Taussig believes in rest and general tonic treatment. He does not believe in irrigations, but prefers instillations of a solution of argyrol, 25 per cent, in the early stages; later a 1-per-cent to 4-per-cent solution of nitrate of silver. Silvol may also be employed advantageously.

G. G. Smith advocates mechanical cleanliness by means of irrigations with potassium permanganate, 1:4000, and the prolonged use of silver salts, such as argyrol (or silvol). He continues these treatments for one month after all discharge has disappeared.

Perrin has treated over 100 cases during the last ten years with injections of protargol 5, water 8, glycerin q. s. ad 50. He claims that all were radically cured within fourteen to twenty days. Most of the cases were chronic and had received a variety of other forms of treatment.

The most elaborate technique is described by Norris, as follows: The child is put in the Sims or knee-chest position. The hymen usually must be sacrificed. The vagina is washed with weak potassium permanganate and swabbed with 25 per cent argyrol solution. It is then thoroughly dried with strips of gauze, and the drying completed with an empty atomizer. The child is kept in the Sims position for twenty to thirty minutes to allow air to enter the vagina. Finally the vagina is flooded with a weak solution of silver nitrate, gradually increased in strength, and glycerin added. The above treatment is carried out three times a week. In the interim the mother or nurse uses a weak permanganate or argyrol solution introduced with a soft-rubber ear syringe. By this method Norris cured fourteen patients in an average of twelve weeks, the longest time being eighteen weeks.

Willcox, after trying all methods of treatment, believes that the disease is controlled but not cured. Fisher has aban-

doned treatment other than the use of irrigations of magnesium, alum, and water. He also advocated the use of general tonic treatment, namely, change of air, arsenic, cod-liver oil, and iron.

Rubin and Leopold insist on the importance of determining the extent of the deep lesions before beginning treatment. For this purpose the electrically lighted female urethroscope should be employed. When irrigations are resorted to, the douche tips should enter the vagina for at least 1½ inches. Applications by swabs used without the urethroscope are injurious and useless. When strong silver solutions are applied to the cervix and vagina, it is well to keep the child in bed for a few days.

Barnett also advocates the use of the electrically lighted urethroscope in the treatment in order to apply the medicament directly to the cervix. This he considers important, as the involvement of the cervix is not easily amenable to the ordinary douche or irrigation. He prefers Lugol's solution 1:500. With the use of the urethroscope he obtains a cure in a month; whereas at the end of six months only seven of his twenty-six patients undergoing prolonged systematic treatment were cured by ordinary irrigations.

Freeman states that local treatment should not be limited to one method, as a change often brings good results. He also believes in the use of the endoscope.

Kerley sounds a timely warning that a large number of cases should be studied before reporting results from any form of treatment, as occasionally a run of mild infection occurs, and the physician, in such an event, becomes unjustifiably enthusiastic about his method of treatment.

One of the most ardent advocates of the use of vaccines is B. W. Hamilton, who treated eighty-four patients with 90 per cent of cures in an average time of fifty days. These figures he contrasts with 260 patients treated by irrigation alone, in whom there were 60 per cent of cures in an average time of 300 days (ten months). He used two stock vaccines and one freshly prepared from an eighteen-hour blood-agar

culture taken from an adult male with urethritis. Apparently local treatment was not used.

UNPARALYZED CASES OF ACUTE POLIOMYELITIS.

The *New York State Journal of Medicine* for June, 1917, contains an article by BOWEN on this important topic. He points out that in mild cases in children there may be nothing to suggest the diagnosis. Definite signs do not appear at once. Afebrile cases are rare. Headache is the second most common symptom. Pain in the neck, back of head, spine, and extremities is common. Bending the neck to the chest is painful and resisted, so that one can often lift a child to the sitting position by the back of the head. Lifting the child by head and buttocks causes painful anterior bending. This is Draper's spine sign. The head is often somewhat retracted, a condition which will be noticed at first glance. Convulsions may occur at any time during the acute stage.

Where meningeal symptoms predominate there is marked headache, anterior and posterior rigidity varying from slight stiffness of the neck, which prevents flexing the head on the chest, to retraction of the whole spinal column and opisthotonus, and when severe there may be twitching, jerking, tremor, convulsive movements, and true convulsions. Reflexes may be exaggerated in the early and preparalytic stage. The patellar reflex may be lost with no other sign of paralysis. Kernig's sign is sometimes found. McEwen's sign is elicited by percussing and auscultating the cranium, and is due to distention of the ventricles by the spinal fluid. Ruhrh considers the following sign important: "If the patient is raised by placing the hands under the shoulders the head will fall back. If the child is told to raise the head when it is sufficiently conscious, it will do so and hold it forward a moment or so, and then the head will fall back." Mentally there may be depression, apprehension, prostration, restlessness, anxiety, confusion, or emotionalism.

Painful symptoms may predominate. Some form of pain is almost constant. Tenderness may also be present. Headache is usually basilar or occipital. Stiffness along the neck and spine are very characteristic. The shoulders and limbs may have influenza pains. Myalgia often precedes and accompanies paralysis.

Gastrointestinal symptoms predominate in certain cases, due to a marked inflammation of the organs of digestion. Anorexia, vomiting, foul breath, sordes, dryness, stubborn constipation, colic, and general discomfort all follow. The vomiting is often recurrent and repeated. It may rarely be persistent and constant. Constipation is almost always present. It is sometimes preceded by diarrhea. Frauenthal believes constipation is more usual in arrested cases. Constipation sometimes persists for a considerable period. The tongue is usually red at the tip, then coated, and later covered with a white film.

The urine is scanty and highly concentrated and sometimes contains albumin. Hematuria is not uncommon, due to a pressure on the bladder walls. Sometimes prostatic catheterization is required.

The skin shows a multiform eruption in about ten per cent of cases. Sweating is fairly common and hyperesthesia is sometimes present. There are sometimes various cutaneous disturbances, erythema, blushing and itching over larger or smaller areas. These are more marked in the paralyzed parts.

The duration of the preparalytic stage may be from twenty-four hours to several days. The temperature is elevated for five to seven days; the pulse usually remains rapid after the fever has subsided. The other symptoms may appear in any combination or permutation. They may subside at any time or at any stage of the disease, from the slightest to the severest paralysis.

If no paralysis develops, the case is called abortive or arrested. Severe symptoms has no bearing on the type or extent of paralysis which may develop. In fact abortive cases may show severe symptoms. Convalescence is usually rapid, but may be slow; vague symptoms

weakness, and pains persisting for some time. Muscle weakness may sometimes be found by the use of Lovett's tests.

Of the value of lumbar puncture Flexner says: "Lumbar puncture in 90 per cent of cases gives a definite diagnostic result. Irrespective of the severity of the symptoms, lumbar puncture yields, in cases of poliomyelitis, a fluid, usually clear, but showing either morphological or chemical changes, or both. The mononuclear cells tend to be increased and globulin is usually present. These changes in the cerebrospinal fluid, especially during periods of epidemic, should be regarded as presumptive evidence of poliomyelitis infection."

Where meningeal involvement is suspected, lumbar puncture should be done as soon as possible, as it not only clears up the diagnosis but relieves pressure symptoms. Bowen found it of great value to examine the fluid at the bedside, leaving the needle in place to give serum if indicated.

In the technique of lumbar puncture Zingher recommends a No. 18 gauge needle 3 inches long. This should have a tightly fitting obturator and fit standard connecting parts so that it may be used for giving serum. It should be kept sufficiently sharp to produce a minimum amount of pain. A small circle of skin infiltration with novocaine or weak cocaine will help in handling young and nervous patients.

The child should be laid on a table and the back held firmly arched by an assistant. For many reasons it is usually not desirable to have the family present. The needle is introduced vertically in the midline midway between the third and fourth lumbar vertebræ at the level of the crest of the ilia. There is nearly always a recognizable sensation as the needle passes through ligament, soft tissue, and finally almost pops through the dura of the canal. In spite of the utmost care some backs seem to put up a solid wall of bone that defies one's efforts, and occasionally a meningeal vein will be pierced, resulting in bloody fluid.

The cerebrospinal fluid is abnormal in

practically every case, and diagnoses based on fluid findings were found to be reliable in all of the author's cases in the 1916 epidemic. It may present a number of changes, which taken in connection with the clinical findings make spinal fluid examination an invaluable aid to diagnosis.

The fluid is sterile to ordinary culture methods and no organisms are found in stained smears. J. A. Kolmer reported microorganisms in the spinal fluid at the Philadelphia County Medical Society in November, 1916. J. W. Nuzum, of the Cook County Hospital, has reported finding streptococci in fifty cases in October, 1916.

The fluid is almost always under increased pressure when drawn, though it rarely spurts. Fifteen cubic centimeters may be drawn from an infant and sometimes 50 Cc. or more from an adult before the pressure is reduced to normal. Bowen found the fluid nearly always sparklingly clear.

Albumin is present in increased amount. Globulin usually gives a marked reaction; it is not present in normal fluid. Fehling's solution is promptly reduced by polio fluid and by most other spinal fluids (except in cerebrospinal meningitis.—Ed.). In examining for cells an acetic acid diluent should be used to destroy red blood cells, and a stain may be added. There is an increased number of cells from the normal 5 to 10 up to several hundred to the cubic millimeter. At first polymorphonuclears predominate, but later there may be as high as 90 per cent lymphocytes. Bowen found also large mononuclears and large irregular cells which are possibly endothelial in origin.

The fluid in the later stages shows a persistence of albumin and globulin for eight or ten weeks. The cells rapidly return to the normal number, though they may persist.

Occasionally a fibrin web forms in or on the fluid after standing a short time. This is characteristic of polio when present. Blood is sometimes present, due to injury of vessels in the canal. When due to hem-

orrhage in the cord itself, the fluid is usually homogeneously red instead of clearing as more is drawn. The fluid may be yellow in cases in which there has been hemorrhage a few days previously.

Zingher places much diagnostic importance upon the slight opalescence of the fluid even early in the disease, which gives a ground-glass appearance throughout the fluid when examined in a clean test-tube by transmitted light, due to cells in suspension. Normal fluid looks limpid, like distilled water. Bowen advises precaution against blood cells which in small numbers produce this appearance, and also against leucocytes in other forms of meningeal inflammation. A microscopic examination should not be neglected whatever the macroscopic appearance. Zingher gives a second macroscopic test which he believes to be of value, namely, the foam test, which depends on the increase in albumin. On shaking half a test-tube of fluid a heavy and persistent foam forms which may last half an hour. On normal fluid the foam is light and evanescent.

DIVIDED BLOOD-VESSELS AS AIDS TO ACCURATE WOUND CLOSURE.

ANDREWS (*Surgical Clinic of Chicago*, April, 1917) dwells with some insistence upon the accurate adjustment of tissues for rapid, clean wound healing, holding that faulty apposition and faulty repair in the deep layers of the skin and below the skin cause broad scars. He regards suturing together the ends of divided vessels as the best means of insuring proper alignment. He states that we know no limit to the perfection of healing which follows minutely accurate closure. He has several times had to regraft torn-off pieces of tissue, usually skin, as a bit of finger, or, in one case, the tip of the nose. If clean, these fit with an accuracy which no new graft can approach. Such pieces carefully fitted to their old bed commonly unite so smoothly as to make the line of union nearly invisible. No graft from another part or another patient ever forms such a perfect implant.

He considers a study of cut vessels as the surest means of identifying the exact longitudinal position of wound edges. That is, by uniting each cut branch to its fellow you obtain perfect wound adjustment true in all three dimensions—the length, breadth, and depth of a wound.

THE RELATION OF STRUCTURE TO FUNCTION AS SEEN IN A MECHANISM OF THE VENOUS SYSTEM.

WOOD JONES (*Lancet*, April 14, 1917) recalls the fact that the primary elements of the tubular vascular system are primitively pulsatile, and this pulsatile power is manifested at an extraordinarily early period. Jones refers to Wharton Jones's observations on the pulsation of the veins coursing in the membranes of a bat's wings, which contracted on an average ten times every minute. The pressure exerted by the surrounding skeletal muscular masses is the chief agent in propelling blood along the veins. There is a generalization which amounts to the statement of a definite law of animal economy that venous channels which run their course in the midst of muscle masses are multiple; and that when emerging into intermuscular spaces these plexiform vessels unite to form single channels again. This might be translated into the terms of anatomical nomenclature by saying that arteries are accompanied by single veins in intermuscular spaces, but are accompanied by irregular and multiple venæ comites when passing in intramuscular planes.

When the muscular system is entirely relaxed, as in sleep, the heart will propel blood to its distal arterial ramifications, but the absence of muscular contractions will impede its return to the heart; venous blood will, therefore, tend to accumulate in the relaxed distal parts. In this way a large proportion of the blood of the body may become lodged in the venous system. Upon waking this blood must be returned to the heart to insure the proper arterial supply to the brain and other organs. It is for this reason that muscular contractions of the

limbs—the familiar stretching—accompany the waking of such animals as sleep lying down in a state of muscular relaxation. Yawning, by causing a suction in the thorax and a compression of the abdomen, attains the same ends. The blood is squeezed home from outlying parts into the cavities of the body, and finally to the heart. It is noteworthy that animals which do not lie down to sleep, or do not thoroughly relax their muscles in sleep, do not stretch or yawn when waking.

One other effect is of peculiarly human interest. If the legs are dependent, but are not engaged in any special muscular activity, venous blood will tend to gravitate into the veins. The deep intramuscular veins are supported by the muscles and cannot overflow, and there will therefore be a tendency for the superficial veins to become distended with blood. This is the etiology of varicose veins in sedentary persons. On the other hand, if the intramuscular veins are vigorously and continuously compressed by muscular action, the burden of returning the venous blood will again be thrown upon the superficial veins. This is the etiology of varicose veins in athletes.

LARYNGECTOMY UNDER NERVE BLOCKING.

MALCOLM HARRIS (*Surgical Clinic of Chicago*, April, 1917) accepted and operated upon a patient with extensive carcinoma, performing radical laryngectomy. The diagnosis of advanced carcinoma was unmistakable, but the stenosis was so marked and the dyspnea was so intense that an operation was imperative. A major operation was performed on the basis that it afforded a slight element of hope and that it is but little more difficult than a tracheotomy, since under nerve blocking it is robbed of most of its difficulty and becomes quite simple. The nerve supply to the anterior region of the neck is well adapted to nerve blocking, and almost all operations involving this region can be performed by this method with great satisfaction. To block this region the needle is inserted just

behind the middle of the posterior border of the sternomastoid muscle. The external jugular vein usually crosses this muscle at about that point, so that the needle usually enters just above and behind the point of crossing on the vein and the posterior border of the muscles, but the vein varies somewhat at times, so that it alone is not a reliable guide. The vein, however, should be identified before inserting the needle, so as not to puncture it and thus inject the solution into the vein. The point of the needle should lie just beneath the deep fascia in immediate proximity to the branches of the superficial cervical plexus.

The needle being now inserted 25 Cc. of the novocaine-calcium-magnesium solution were injected on either side of the neck; 10 Cc. of the same solution were next injected on either side, near the outer end of the hyoid bone. In less than five minutes there was a complete anesthesia of the entire region of the neck. An incision was made along the midline of the neck from just above the hyoid bone to the suprasternal notch, and, on account of the enlarged glands on the left side, a transverse incision was made near the upper end parallel with the hyoid bone. The longitudinal incision was carried down at once to the thyroid cartilage above and to the trachea below, exposing the isthmus of the thyroid, which was doubly ligated and divided and the lateral halves pushed aside. A loop of strong silk was passed around one of the cartilaginous rings of the trachea, the trachea completely divided above that ring, and the lower end of the trachea drawn out at the lower angle of the wound. A few drops of the novocaine solution were then injected into the mucous membrane of the proximal end of the trachea; there was no evidence of tracheal irritation, no tendency to cough, and no change in the rate or character of the respirations after treating the trachea in this manner. By means of the silk loop about the ring of the trachea the end of the trachea could be easily drawn forward out of the lower end of the wound so there was no interference with respiration. The advantage of not being bothered by the anes-

thetist at this point of the operation was very apparent. On account of the dissection of the upper anterior triangle of the neck, which was planned, he turned down and out skin-flaps at the upper angle of the incision.

He then proceeded to dissect out the larynx completely, including the tissues and lymph-glands on either side above. On dissecting posteriorly he reached the region of the esophagus and the pharynx, without causing any pain, but cutting the wall of the pharynx was painful. This was expected, as this region is not supplied by the cervical plexus, but by the glossopharyngeal nerve, so a few drops of novocaine solution were injected along the wall of the pharynx so as to block this region. In doing this one should be careful not to block the pneumogastric nerves. Having made this injection, the patient gave no further evidence of pain. The larynx was completely removed, including the epiglottis and the surrounding tissues. He was able to close off the pharynx in front with catgut. A drain was placed in the upper end of the wound and the skin closed down through the lower angle, where he brought the proximal end of the trachea to the surface and carefully sutured it to the skin, leaving the opening free without the introduction of a tracheal tube.

The patient was placed in bed and allowed to sit up at once, and fed for a few days through a tube.

Any one who has undertaken, or even witnessed, an operation for the complete removal of the larynx under general anesthesia cannot fail to be impressed by the ease and facility with which the operation can be performed under nerve blocking. There is no difficulty with respiration, no trouble or annoyance with the anesthetic, and the patient's general condition at the end of the operation shows that there has been practically no shock. His pulse was 90 before starting the operation, and it was only 100 at the termination, the quality and fulness remaining about the same. It was quite evident from his actions during the operation that he suffered no pain, and this,

too, notwithstanding the fact that he had received morphine, scopolamine, or other drugs before the operation, showing conclusively that the anesthesia and freedom from pain were due entirely to the nerve blocking.

TREATMENT OF OSTEOMYELITIS

SIMMONS (*Boston Medical and Surgical Journal*, May 10, 1917) contributed a paper on this subject two years ago, in which he reached the following conclusions, nor is he now prepared to change them, thus expressed:

In children with pain in a limb suggestive of toxemia, always consider osteomyelitis.

Operate early, even if the symptoms are rather vague. If the diagnosis is in doubt, practically no harm is done; while, if correct, a great deal of suffering is avoided.

In acute cases, open to the medullary cavity, pack the wound. Prognosis good. In chronic cases, treatment and prognosis vary of course, but somewhat in these early cases, but the earlier the operation the better the prognosis.

In cases in which bone destruction has been taken place, seen less than three months after the onset of the disease, subperiosteal resection when possible. Prognosis good.

In chronic cases of bone abscess, if of less than one year's duration, open and drain. Prognosis good.

In chronic cases, with bone destruction of less than one year's duration, open, remove sequestrum and pack. Prognosis good.

In old chronic cases, either with bone destruction or of the bone abscess type, remove necrotic areas and drain. Then, if possible, obliterate the cavity with flaps of healthy tissue. If this cannot be done, either with bone wax, pack, or sterilize the cavity, and fill it to fill with blood-clot, and close the wound. drainage. The prognosis, if the cavity can be obliterated, is fair, otherwise poor.

The treatment, when such bones of the pelvis are involved, is unsatisfactory, the prognosis problematical.

When, in old chronic cases, the whole shaft of a long bone is badly diseased, the possibility of resection of the entire shaft, with bone transplantation, should be considered before amputation is resorted to.

His cases were treated in the routine way, and operated upon as soon as the disease was suspected. A tourniquet was always used, as with it a much better idea of the condition of the bone may be obtained. It is also of value in preventing fat embolism which is seen after bone operations. To the writer's knowledge he has never seen a case. An incision is carried through the periosteum, and an opening made into the medulla with a burr or trephine. This should always be done, even if there is pus in the soft parts and under the periosteum. If the medulla is diseased, an opening should be made below the first, and still others below this until normal appearing marrow is reached. Never curette, as this spreads the infection and destroys any endosteum remaining alive. The wound is then packed. If the bone dies, a second operation, subperiosteal resection or sequestrotomy, is done in from four to ten weeks, depending on the bone and the rapidity of formation of the involucrum has formed, following the changes necessary to wait until considerable involucrum has formed, following the changes with the *x*-ray, but the sequestrum should be removed at the earliest possible moment. Other minor operations for the removal of small sequestra, which have formed later or which have been overlooked, are the rule, but if the case is carefully followed they can be done early and amount to little.

The results of these cases show the value of early treatment. Of the fourteen acute cases, two died at once of septicemia and two have not been traced. Of the ten, prompt operation resulted in cure without bone destruction in three, and the other seven are well from one to two and a half years after the second operation of sequestrotomy or resection. Of eight cases seen from one to four months after the onset of the disease, six are well, one has not been traced, and one, a femur, is still draining—

the author states that he doubts if he will ever be well.

Diagrams and clinical histories follow. He notes that cases seen within a few weeks from the date of onset should be cured by operation. One operation is usually insufficient, and two or more are often necessary.

At the first operation, however, some idea of the prognosis can be obtained, and a more or less definite plan for further operations determined upon.

Osteomyelitis of the ilium or femur is difficult to treat, and the hope of a cure is much less than when other bones, as those of the forearm or leg, are diseased. Multiple osteomyelitis is exceptionally difficult to cure, but each bone should be treated as if it alone were the only one affected. Infinite pains and patience are necessary to cure any case, and it should be followed up very carefully, especially during the first year, and *x*-rays taken at frequent intervals.

THE USE OF RADIUM IN POSTOPERATIVE CONDITIONS.

HARRISON (*International Journal of Surgery*, April, 1917) believes there is sufficient clinical evidence to prove the postoperative importance of radiation. The application should be done at once. He advises that these postoperative radiations play important rôles in the treatment of cancer of the vagina or vulva. He believes that certain types of sarcoma cells are more readily influenced than others; small round-celled sarcoma and the lymphosarcoma respond more readily; while Morson holds that if growing from tissues other than bone the spindle-celled sarcomata respond as readily as do the round-celled.

In treating the uterine cases the more penetrating rays are used, thus avoiding the irritating and destructive action of the softer rays. Unpleasant toxic reactions follow long exposure to heavy doses. An exposure of from 600 to 750 milligram-hours, repeated at intervals of four to six weeks, has been found to be adequate. It is held that cancer of the rectum when

inoperable offers a particularly favorable field to the use of radium. This, however, is not in the least in accord with clinical experience. The basal-celled epithelioma or rodent ulcer responds so satisfactorily to the action of radium alone that operative measures are seldom necessary for its treatment. Occasionally to expedite matters the thick, beaded edge may be curetted, after which the application of radium soon results in healing with very little and hardly noticeable scarring. It is advised to excise first the squamous-celled epithelioma if the growth appears to have invaded the subcutaneous tissues, followed by subsequent raying of the part.

As to the physics and methods of application of radium. As used in therapeutics, one of its salts, usually the bromide or sulphate, is employed. The changes produced depend upon the energy given off by the salt in the form of rays, which are of three kinds, called the alpha, beta, and gamma rays. The alpha rays are really positively charged atoms, material particles, about twice the size of one atom of hydrogen. They form about 90 per cent of the total radiation, and are projected with a velocity of about twenty thousand miles per second, but as they have very little penetrating power, being easily stopped by a thin piece of paper or rubber, they do not ordinarily have much therapeutic value. The beta rays are negatively charged particles, projected with the velocity of light. They are almost identical with the cathode rays liberated in a vacuum tube. About 9 per cent of the radiation is formed by these rays, which vary in their penetration, so that various gradations from "soft" to "hard" beta rays are encountered. The gamma rays form about one per cent of the whole radiation, but they have great penetrating power. They will traverse quite readily as much as ten centimeters of lead. Their velocity is that of light, and they are a pulsation of the ether, being similar to the x-ray, from which, however, they differ in their far greater penetrative power.

By interposing screens of aluminum or brass of varying thicknesses the passage of

different rays can be prevented, so the desired kind of radiation allowed to pass and exercise its therapeutic effect.

As supplied by the manufacturer the apparatus is in two forms, the flat applicator and the tube. In the former the radium salt is spread out on a flat surface and gives out its rays only in the one direction. For applying to large surfaces the tube is the best type of applicator. In the tube 10, 25, 50 or more milligrammes of radium are enclosed in a platinum tube, which may be inserted directly into a tumor or into the various body cavities.

No absolutely satisfactory method of estimating the dosage of radium has yet been determined. Many observers use the milligram-hour method, as suggested by Dr. Dawson Turner, while others prefer simply to state that they have used a certain applicator containing so much radium for a certain period of time.

INFECTIONS OF THE BLADDER SPECIAL REFERENCE TO LOCALIZED RESISTANT AREAS OF CYSTITIS.

GERAGHTY (*Surgery, Gynecology and Obstetrics*, June, 1917) observes that the management of a case of simple acute cystitis, as far as the diagnosis and treatment is concerned, seldom entails any difficulty. An examination of the urine in connection with the history and symptoms is usually sufficiently definite. The treatment is comparatively simple. Our main end in the treatment of these cases should be to place the bladder at rest as much as possible, and this is done in two ways: first, by the liberal employment of sedatives, resorting if necessary to the plenest use of morphine, or preferably penthrine; secondly, the decrease of the bladder activity by decreasing the amount of fluid ingested. The mistake is frequently made of forcing water on these patients. It were to purposely adopt a procedure which would aggravate the condition he should select anything more efficacious. The water should be decreased to the

needs of the individual, so that the bladder will not be constantly obliged to expel the rapidly accumulating urine. In order to combat the increased acidity of the now concentrated urine, alkalies should be given to the point where the reaction becomes alkaline. Urotropin is useless; if the urine is allowed to remain acid, the formaldehyde liberated would but add to the irritation, and if it is rendered alkaline the urotropin will not be decomposed and consequently no formaldehyde will be present. The use of the drug in acute cystitis cannot be said to have much value.

Active treatment, such as instrumentation, irrigations, and instillations, during the acute process is usually more harmful than beneficial. When the symptoms do not subside and the infection persists, it is usually an indication that there is present some complication which is responsible. In such cases a careful investigation must be made to determine this factor. In some it will be found that the cystitis is but an expression of a renal infection above, or there may be some malformation or deformity in the urinary tract which is not allowing complete emptying or evacuation of the vesical contents.

In the vast majority of chronic or long-resisting infections of the bladder, it will be found on investigation that the infection is secondary really to some other focus in the genito-urinary tract. Every one is familiar with the rapidity with which a cystitis will clear up when an unsuspected stricture or a pyelitis is discovered and properly treated. At other times the infection is dependent upon some form of obstruction at the vesical orifice. Occasionally the cystoscope will reveal the presence of a diverticulum which has become infected, and owing to the lack of proper muscle in the diverticular sac, the contents of the sac are never completely emptied and it serves as a reinfecting focus for the bladder itself. A small series of recurring and persistent urinary infections, recently reported by the writer, which had stubbornly resisted all efforts, were finally entirely cured by opening and drainage of

the seminal vesicles, the latent infection in these organs keeping the bladder infected. Occasionally an infected utricle is discovered, and elimination of the infection from this source is followed by disappearance of the infection from the urinary tract, or again the prostate is at fault.

It is now pretty thoroughly understood that before one can begin the intelligent treatment of an infection of the urinary tract an investigation of the whole tract must be undertaken. In most cases the successful treatment of a case of chronic cystitis will depend upon the ability of the physician to locate the intravesical or extravescical factor which is responsible for the continuance of the infection, and in most instances if this factor can be rectified the cystitis will promptly be cured. The treatment of chronic cystitis has largely become a matter of treatment of associated conditions or lesions, and our ability to give a prognosis in any particular case will depend upon the possibility of removing the contributing cause.

We are obliged to admit, however, that in a definite number of cases the failure of the vesical infection to disappear spontaneously is not due to any extravescical factor. These form a very interesting group of cases. In most of them the disease is not a diffuse cystitis, but a localized affair with normal mucous membrane lying between the infected areas; the areas may be single or multiple. Sometimes the lesion is a localized area of reddening and hyperemia; at other times there is edema of the mucous membrane, and even the formation of bullæ, and at times superficial ulcerations are observed. When the lesion involves only the mucosa and to a slight extent the submucosa, simple irrigations with silver nitrate or other silver salts, particularly if the bladder is overdistended with the irrigation at each treatment, will very promptly lead to disappearance of the infected areas. Where, however, these localized areas of cystitis involve markedly the submucosa and to a slight extent the muscle of the bladder-wall, irrigations used in the ordinary way have comparatively

slight influence. For the treatment of these resistant areas of cystitis, the writer has been using during the past two years a particularly efficacious method, which is as follows: The bladder is filled with salt solution, and then a ureter catheterizing cystoscope is passed and an ordinary ureter catheter without the side eye, and with the end cut square, is passed into the bladder. The tip of the catheter is then placed against the area to be treated, and a 10- to 20-per-cent silver nitrate solution injected directly on the area. In this way it is possible to secure a local application of a very strong solution, and at the same time not irritate the rest of the bladder.

The excess of silver is immediately neutralized by the salt solution and the effect of a strong application is secured on the area desired. In women, by means of the Kelly cystoscope with air distention, the application of strong solutions to localized areas is, of course, readily made, and the results obtained by this method have been indeed most gratifying. In the male by the method above the same therapy is attained. In some instances in which the lesion is particularly resistant, he has fused a silver nitrate point to the end of a metal-tipped ureter catheter, and it is possible in this way to paint the desired area with the silver nitrate stick itself.

WAR-SURGICAL IMPRESSIONS GAINED IN FRANCE.

GUILDAL (*Kriegschirurgische Eindrücke aus Frankreich; Hosp.-Tid.*, Kjobenh., 1916, lix, Nos. 27 and 28) discusses his impressions and experiences gained in French hospitals. He visited among others Compiègne; the experimental station of Carrel; Montdidier and its hospital, which admits exclusively thoracic, abdominal, and cranial injuries; Amiens, with its special hospital for face and neck injuries.

Infection is the dominant factor in military surgery, especially now with the long-drawn-out trench warfare. Of the small, medium-sized, and large injuries, the small are almost never, the medium-sized usually,

and the large or severe injuries invariably infected. As also in Germany the number of artillery wounds has increased enormously with the trench warfare. The time elapsing between the injury and the beginning of treatment is the important element in the infection of wounds.

The author discusses the disposition of the wounded from the trenches. The wounded are first taken to the "post of secours," where only severe hemorrhages are checked, tracheotomies performed, fractures immobilized. After that the wounded are taken to the "poste de dépôt," then to a distributing center. Slightly injured are taken to a hospital near the front. The moderately severe are taken to an evacuation hospital, the severest to the surgical ambulance, usually 5 to 10 km. from the front. Here operative procedures can be undertaken. After that the injured are taken to the hospitals.

At the beginning of the war all wounds were treated very conservatively, but later led to very poor results. Antiseptic procedures do not play an important part. The expectations of Carrel's method of irrigation with Dakin's fluid were only partly filled in part.

The important point in the treatment is that the injured person receives attention during the first twelve hours. The wound is opened and thoroughly drained. The wounds are cleansed more quickly by this method, but a very complicated apparatus is necessary. Since the wounds are now opened widely the infection is less virulent. Gaudie at Montdidier excises the entrance and exit opening of a malignant tumor to healthy tissue and closes the opening per primam. As usually the author mentions the fact that Gaudie employs methylene-blue solution. The most striking result that all patients, doctors, beds, and the hospital are benefited.

With the exception of a few late cases of tetanus was not seen. Collargol and cine treatment, according to Wright, employed without any special results.

The statistics given the author by J.

are of interest. Following an attack by the Germans upon a trench the author had, among 150 wounded, 30 injuries of the head, 20 per cent; 20 face and neck injuries, 13 per cent; 8 thoracic wounds, 5 per cent; 2 abdominal, 1 per cent; 43 upper extremity, 28 per cent; 27 lower extremity, 18 per cent. Following a French attack there were brought in 38 injuries of the head, 17.3 per cent; 43 of face and neck, 19 per cent; 26 of the thorax, 11 per cent; 4 of the abdomen, 1.8 per cent; 51 of the upper extremity, 23.2 per cent; and 57, 26.8 per cent, of the lower extremity. Among 2334 injuries Leriche saw 229 head injuries, 210 of the face and neck, 179 of the thorax and back, 117 of the abdomen and pelvis, 614 of the upper and 601 of the lower extremity.

The author comments on the fact that since the introduction of steel helmets the number of head injuries has increased considerably. He explains this by the fact that before their introduction many of those injured were killed outright. All skull injuries are operated primarily. Special treatment is accorded to injuries of the lower jaw. Especial mention is made of the flying laparotomy ambulances, consisting of 11 automobiles and 15 physicians, and which in two hours set up barracks and everything necessary.

Quenu reports statistics of Stern showing 300 cases of abdominal wounds treated conservatively with a mortality of 80 per cent, and 260 cases treated by operation with a mortality of 60 per cent.

The author saw but few injuries of urinary organs—two or three bladder injuries. Bone injuries are not treated conservatively as at the beginning of the war. The wounds are opened up, and loose or easily loosened fragments are removed. The danger of pseudarthrosis formation is not great.

Considerable difference of opinion exists regarding the treatment of joint injuries, but it seems that resection is preferred to the conservative treatment. He saw but few aneurisms, and these were treated by ligation. Nerve injuries are common and

should be operated upon early. In regard to amputation, everywhere there was marked conservatism. Bullets are removed if they produce disturbances, and the danger of removal is not too great. He observed an attempt to remove a bullet from the lung producing symptoms only on deep breathing—the patient remained on the table. Two shell fragments were sought in vain, and in the posterior mediastinum. The methods of localization are the same as ours.

TRANSPLANTATION OF THE URETER.

Following traumatism and resection of the bladder for cancer, JUDD (*Surgery, Gynecology and Obstetrics*, June, 1917) observes that in 17 cases of cancer of the bladder very satisfactory results were obtained by transplantation of one or both ureters. In every instance when the cystoscopic examination could be made after the transplantation of the ureter, the latter was found open. In two cases the ureter was liberally ligated with the idea of doing a nephrectomy. Later this last procedure was not called for, nor did any harm seem to result from the procedure.

As to the technique, the straight rectus cut was made from the symphysis almost to the umbilicus. The peritoneum was dissected back and the ureter was exposed. In one instance the peritoneum was opened. The ureter was liberated as far down toward the bladder as possible. In each instance, these being traumatic cases, there was much scar tissue and the dissection was continued into it. The ureter was divided between clamps and the lower end ligated with plain catgut. The ureter was liberated from its bed sufficiently to make anastomosis into the bladder free from tension. The end of the ureter was split for a short distance and a small opening made into the bladder wall. In order to hold the ureter in place, each of the two parts of the ureter was stitched by a plain catgut suture to the mucosa of the bladder. The bladder was then accurately stitched around the ureter.

Intravesical transplantation of one of the

ureters in 17 patients suffering from carcinoma has been performed. Thirteen of these patients were males, and four were females. From one-third to two-thirds of the bladder was resected, and the ureter transplanted into the remaining portion. Three of the 17 patients died in the hospital. One lived five days; one, six days; and one, twenty-three days. Eight of the patients survived the operation and have since died. The average length of life was two years and one month. One patient lived seven years.

Five of the remaining six patients are living at the present time, from which it is shown that transplantation of the ureter to another section of the bladder can be performed and the function of the kidney maintained. It seems that this is entirely feasible, that it is the procedure of choice in cases of ureteral fistula, and that it is much to be preferred to sacrificing the kidney.

SECONDARY HEMORRHAGE.

TAYLOR (*Practitioner*, May, 1917) observes that the treatment of secondary hemorrhage is one of the most difficult and anxious problems that come before the military surgeon, and in hospitals dealing with recent gunshot wounds it is an accident of rather frequent occurrence. The cases are almost invariably very septic. The patient is seriously ill from septic absorption, ill-fitted to bear even a slight loss of blood, and often has to undergo a major operation before the bleeding can satisfactorily be controlled. The choice of the method of treatment is often a very difficult one, although in other cases, unfortunately, there is no choice in the matter, and one finds oneself compelled to carry out some treatment that leaves the patient only a very small chance of recovering. The question of the possibility of saving limbs is a problem that is constantly coming up, and often adds greatly to the difficulty in deciding the line of treatment that should be adopted.

Where possible, the wound was opened

up and the vessel controlled at the bleeding point. In this way there was danger to the life of the limb, but in most of the cases this method of treatment was impossible. The parts were so inflamed and infiltrated to such an extent that relations could not be recognized. The tissues were so friable that they would not hold instruments or ligatures, and the patients were so ill that they would not stand the longer operation of ligature of the wound. Proximal ligature of the vessel had to be resorted to. But in cases in which it was possible to expose the vessel in the septic area, the results were better, and there was no recurrence of the hemorrhage afterward.

Of all secondary hemorrhages, the most common occurring in gunshot wounds of the arm is especially with fracture of the femur, and is the most serious. If the wound is in the upper part, necessitating ligature of the common femoral, gangrene almost invariably takes place, and yet most of the patients will not stand an amputation. The condition is toxic and relatively bloodless compared with the hemorrhage.

Hemorrhage in arm wounds is usually less serious. Even when there is considerable sepsis, the axillary or brachial artery could be ligatured without serious effect. There did not seem to be a greater tendency for the infection to set in after ligature. In two of these cases hemorrhage occurred a second time. In the first the wound was on the inner side of the upper forearm. The ulna was fractured, and the wound was deep, ragged, and septic. The brachial had been tied in the first operation. Hemorrhage again occurred from the depths of the wound. It was considered to be coming from a branch of the brachial artery, although it was impossible to find exactly where the bleeding point was. The ulnar artery was ligatured in the second operation, third, close to the bifurcation of the brachial, as well as in the lower third of the arm, to prevent recurrent flow, and the bleeding was completely stopped.

Gunshot fractures of the jaws were the most common sources of secondary hemorrhage, and in most of these were slight and could be treated by

syringing the mouth with cold water, but, on the other hand, when they recurred again and again, it was necessary that something more radical should be done. As it was quite impossible to reach the bleeding point, and often very uncertain which vessel was bleeding—the tongue was often injured—ligature of the external carotid was the operation usually done. When this was done, in no case was there any serious trouble with bleeding afterward. In one case, in which the common carotid was tied, severe bleeding recurred later.

In some of the cases hemorrhage had a tendency to recur again and again. The most remarkable case was one which bled altogether six times, definite measures being taken each time to arrest it.

It is important to deal promptly with these hemorrhages by some radical method in nearly all cases. Oozing, say, from a fractured jaw may be temporized with for a time, but if there is distinct arterial hemorrhage it is a mistake to waste time with packing or any other temporary measure. Bleeding almost invariably recurs, and operation has to be resorted to in the long run, when the patient is less fit to stand it. One is struck with the fact of collapse being out of all proportion to the amount of blood lost. This, the author thinks, is due to the heart, degenerated through septic intoxication, being greatly hampered by even a small sudden loss of circulating fluid.

In the immediate after-treatment, everything was done to give the patient a free supply of fluid. Intravenous saline was hardly ever given, but almost invariably subcutaneous infusion was carried on for twenty-four to thirty-six hours. Rectal salines were also administered, and the patient was given abundant fluid to drink as soon as he recovered from the anesthetic.

Beyond the ordinary cleansing and drainage of wounds, the author considers that little can be done to prevent secondary hemorrhage. Several of the medical officers, however, observed that bleeding seemed to be more frequent in cases in which eusol was being used. It may have been a coincidence, but there were more

cases of hemorrhage from the wards where it was being used as a routine. It is possible that it has a digestive effect on the softened walls of the vessels.

KEEPING DOWN FLIES.

The *Indian Medical Gazette* for April, 1917, extracts a paper on this subject by C. G. MOOR (*Proc. Roy. Soc. of Med.*, December, 1916). Alluding to the use of arsenic, formalin, and other methods, he states that a sticky mixture can be made on the spot, which is quite as effective as anything that can be bought and very much cheaper. It can be applied to paper, string, old tent-ropes, or wires. The sticky mixture (or "fly-glue") is prepared by painting a hot mixture of two parts by weight of powdered resin to one part by weight of castor oil on to any suitable material. It requires a little practice to make the mixture, which is prepared by heating the ingredients in an old saucepan or dekchi, and stirring all the time with a stick. This mixture is very stiff and tenacious when cold, but when hot it is quite fluid, like ordinary oil-paint. As it is difficult to carry about papers coated with the fly-glue, it is best to apply the glue to wires, for in most camps there is a quantity of wire to be found which comes on the hay-bales. This can be straightened out and cut into 2-foot lengths. An inch at one end is bent so as to make it possible to hang the wires on nails. The mixture can be kept in tins for weeks or months, but it should not be applied to the wires or paper until they are required for use. The wires are painted with the glue, and then placed in a bucket made out of an old cresol-drum; 500 wires can be easily carried by a man. They are hung up on nails in latrines, kitchens, larders, and food stores; in a marquee they can be hung on a string stretched between the two poles at a distance of 9 feet above the ground. As soon as they are full of flies, or in any case not later than after two days, they are replaced by fresh wires, and the old ones are placed in bundles in a low furnace and burned off. They are

then ready to be glued again, and can be used all the season, and then put in a dry place for the following year. In a bell-tent they may be hung with the bent end hooked in each of the three small ventilators; in this position the sticky portion does not touch the tent, nor the poles, nor the men's heads or clothes. There is nothing in the mixture which is attractive to flies, but they like to settle on anything which is dark and narrow, and hanging down.

SPHAGNUM SURGICAL DRESSINGS.

PORTER (*International Journal of Surgery*, May, 1917) notes that moss dressings can be produced and will probably in the end be preferred to all cotton in at least military cases. The British War Office accepts the dressing as official. The dry moss of the proper variety has very marked absorptive powers and holds whatever liquid is taken up far better than absorbent cotton. Moreover if the sphagnum be slightly moist the absorption is very much more rapid than in the case of cotton. As compared with this, a fair average dressing made from sphagnum papillosum will get thoroughly wet in one-third the time required by cotton and will hold sixteen to eighteen times its own weight of water, which is reduced to say twelve times by handling. Exceptionally good moss will absorb twenty-two times its weight of water and will keep fifteen to eighteen when appreciably knocked about, and even very poor moss takes up and holds more water than the best cotton.

When dry it is exceedingly light and elastic, and owing to its open structure dressings are cooler and less irritating than those made of cotton. The dressing will continue to take up the fluid discharges until saturated throughout. The collector should gather only the softest and the close-leaved plants, and when possible should be provided with reference samples of suitable material. The dressing of the required thickness is wrapped in gauze and is sterilized in an autoclave thoroughly before being used; or sterilization may be accom-

plished by dipping the sphagnum in corrosive sublimate of such strength that it has been passed through a wringer and hung up to dry it with one-fourth of one per cent of solution. Mechanical compression makes traction easier and does not damage the material under normal circumstances.

INFECTIOUS FIBROSITIS—TRENCH SHIN.

CHAMBERS (*Lancet*, May 19, 1917) describes a new condition common among soldiers to justify this term. The symptoms, in addition to pain and tenderness in the lower limbs, are characterized by fever, often high, disappearing in a few days, accompanied by a polymorphous leucocytosis which persists after the fever goes. The common sites of pain are the shin bones and anterior tibial muscles. The pain is dull, aching, and increased on pressure, nearly always bilateral, and is associated with pain in the back. The tibias are extremely tender to pressure. Indolence associated with fever is regarded as a diagnostic symptom, often being associated with a neuritis of the upper extremities and pains in the ligaments and joints. Of further diagnostic value is the prolonged course of the disease, lasting from one to three months.

In distinguishing between trench fever and trench shin the picture is much more clearly defined. The best guide as to the progress of recovery is the intensity of the pain. If it gradually diminishes from day to day recovery is expected in from three to three weeks. Treatment is chiefly preventive. It is obvious that one of the essentials is the avoidance of anything such as tight boots or puttees, which are likely to obstruct circulation. Rubbing the feet and legs, if necessary the whole body with animal fat or animal oil is sufficient. It should be used in considerable quantities and should be of a high boiling point. Daily massage of the parts also seems serviceable. During the acute period bed and various medicines are advised.

An interesting note in regard to the above communication by McCREA (*Lancet*, May 26, 1917) states that he believes that trench fever is due to spirochætæ, the Wassermann being positive in the vast majority of these cases. Thus Riemer obtained spirochætæ in the blood in this disease and cultivated them.

WOUNDS OF THE LUNG IN THE PRESENT WAR.

ARCHIBALD (*International Journal of Surgery*, May, 1917), on the basis of about sixty cases seen at a casualty clearing station some five or six miles behind the front-line trenches, and many more observed at a base hospital in France, to which the chest cases were sent, usually five days or more after the receipt of the injuries, contributes an interesting practical paper. He notes that the clinical signs and symptoms varied greatly as the cases were seen at the front or at the base. At the front they usually arrived in the casualty clearing station within three to twelve hours from the injury, although a few, chiefly those suffering from urgent dyspnea and severe hemorrhage, were sometimes kept one or two days in the field ambulance. The striking symptom in nearly all was dyspnea with orthopnea. The patients suffered on the whole very little from severe shock. Their blood-pressure was almost always normal or nearly normal, but the degree of dyspnea was often to the uninitiated quite alarming; particularly was it apt to be so if there were present an open wound in the chest wall, establishing an acute open pneumothorax. Frequently with the movements of respiration blood would pour out in quantities and be sucked back. In such cases relief was most readily got by plugging the wound air-tight, converting the open into a closed pneumothorax, and thus saving the mediastinum. Morphine was the great standby, and its effect was quite remarkable. In some there was noted a most severe and apparently spasmodic pain in the region of the diaphragm, together with intractable cough. These cases were

best relieved by heroic doses of morphine. However, and fortunately, neither pain nor cough was a troublesome symptom in the majority of the patients. Their chief distress was from shortness of breath.

On physical examination a hemothorax was found with great constancy, much more so, for instance, than hemoptysis. It is fairly certain that the blood came in most instances from the wound in the lung, but in some it certainly originated in a wound of the intercostal vessel. The amount of blood effused, as shown by percussion, was nearly always sufficient to give dulness up to the angle of the scapula, but frequently it went higher than this, and, rarely, it filled the whole chest.

Fever was constantly present. When infection remained absent it usually did not go above 101°, and came down to normal in four or five days. In some cases moderate fever would last eight, ten, or even fourteen days, without repeated punctures finding any infection.

The improvement of the patients in the first day or two, after being put to bed, was often remarkable, particularly in the dyspnea. They learned to regard their chest cases as not being, on the whole, anxious ones; nevertheless, in perhaps three or four per cent the patient would die, of cardiac as well as respiratory failure, from the accumulation of air and blood in the chest cavity. This happened in two of the sixty odd cases seen at the front. They were difficult, within the first twelve to eighteen hours, to distinguish from the ordinary dyspneic case which gets better, and in the rush of a large convoy they both slipped past and died without the obviously necessary operation of a thoracotomy. One of these was certainly a valvular pneumothorax; at post mortem air under tension was found in one side of the chest. This condition is certainly a rare one. In fact, pneumothorax in general was remarkable by its absence. It may be, as Prof. C. P. Howard suggests, that small amounts of air are frequently present in the first two or three days, but are unrecognized; but if so, the fact remains that careful physical

examination at the front as well as at the base usually failed to yield any signs by which pneumothorax could be established. It is true, as they found at the base, from their work in injecting oxygen following the aspiration of blood, that the text-book signs of air in the chest were not to be got in many cases.

Operation in the casualty clearing station was very rarely necessary. The patients were usually kept five days or more for safety, and were then sent down to the base. During these few days infection seemed to be decidedly infrequent. If present, it was not apt to go ahead fast enough to render diagnosis obvious, and most empyemata were operated upon after reaching the base. From letters recently received, better work is now being done in the way of early exploratory punctures and bacteriological investigation, with the result that early empyemata are being found and operated upon more frequently.

Their experience at the base was in many respects quite different from that just described. The patient usually arrived in fairly good condition with little if any dyspnea, largely recovered from the distress of the first few days, and with a hemothorax which had reached its maximum and was stationary. The danger was no longer that of hemorrhage or of mechanical interference with respiration and heart action; what they had to fear was chiefly infection. Accordingly, in such cases as still showed fever, the first thing done was to remove some blood for bacteriological examination. Now the finding of infection was frequently not the simple matter that it might appear to be. While the blood effused into the pleura nearly always remains fluid for a long time, there is, nevertheless, in many cases, some degree of clotting, with the result that the pleural space might be divided up into two or more walled-off cavities, and the blood removed by one puncture might be sterile, while that from another puncture, in a different spot, would be infected. It therefore became the rule in the presence of fever, prolonged more than eight or nine days,

or before that lapse of time, when clinical symptoms suggesting infection were present, to repeat punctures in different places until one had assured oneself that blood from all parts of the cavity had been examined. It happened on a number of occasions that a positive bacteriological finding on the third, fourth, or fifth puncture only was obtained. Another point was that bacteria apparently can be present in clots, and not break out and infect the general mass of blood for some days. The problem was thus often a more complicated one than we are accustomed to encounter in the ordinary empyemata of civil practice.

It was astonishing to find in how few cases, comparatively, infection did develop. Of course with clean bullet wounds it practically did not occur, but they had expected that fragments of high explosive would very often indeed carry in infection. So little was this the case that, speaking generally, empyema occurred in their cases only in about 14 per cent (11 to 82 analyzed). Of the empyemata which did develop the mortality was on the whole higher than in civil practice. Of the 11 cases just mentioned, four died—one from a streptococcus and anaerobic infection; two from a streptococcus septicemia, of which two, one really died from a secondary hemorrhage; and the fourth from the combination of streptococcus infection with multiple injuries. Of those which recovered, seven in number, six had streptococcus infection, one complicated by a streptococcus septicemia, and the seventh was chiefly infected by fecal bacilli.

In those cases that remained sterile their practice was to aspirate practically all of the pleural blood anywhere from the seventh to the twelfth day, but preferably early, and to replace simultaneously, but through a second needle, an amount of oxygen corresponding roughly with the amount of blood removed. This was to prevent secondary oozing. The author said he doubted if it had any such effect, but he continued it because it made the aspiration so easy and painless. The usual distressing cough toward the close of

aspiration was always prevented. The amount removed was usually from fifteen to thirty ounces, but he had taken off as much as eighty at one sitting without harm. They always did this under the control of manometer readings of intrapleural pressure. It was interesting to note that this was very rarely positive, and then only to the extent of 2 to 4 cm. (water) at the end of expiration. Negative pressure during inspiration ran usually from 8 to as high as 16 or 18 cm. of water.

Concerning the question of the removal of foreign bodies embedded in the lung, the English practice was to leave them alone. Among the French surgeons there grew up during 1915 and 1916 a strong tendency to remove all except the smallest. Marion, Duval, and a Bordeaux surgeon reported series of from 30 to 60 cases with practically no mortality, each upholding a different method. For himself, after his experience of removing some four or five, he came to the conclusion that from no point of view was it justifiable within at least the first month or two to remove foreign bodies by operation unless it could be shown that an abscess was developing around them. Now this was an interesting and somewhat surprising fact, that lung abscess around a foreign body, at any rate during the three to five weeks' stay of the men in France, was a thing of the utmost rarity.

FLIES IN FIELD SURGERY.

KANE (*International Journal of Surgery*, May, 1917) writes a vivid description of the pest of flies. It is stated that the wounded man, powerless to move, feels them creep over his face and hands, biting and tickling, rendering sleep impossible save through sheer exhaustion. (Even at night some species of flies are active.) Lighting about the eyelids and angles of the mouth and within the nostrils, they seek there to deposit their ova the moment the worn-out sufferer chances to drop asleep, or faints from pain and hemorrhage. They swarm around the margins of the blood

pools to slake their thirst, being thus attracted in hordes. They light upon the dead and dying, and buzzing from one mangled soldier to another they carry to each a mixed contamination from the infirmities of all. In and upon the wounds they are the first infective agents. From the early gray light of dawn until the cool shades of evening they visit each nook and cranny of the mutilated surfaces, dropping everywhere their glossy masses of eggs, which finally may cover the entire surface with a moldy, frost-like incrustation of blows. Within twenty-four hours after delivery the hatching begins, and soon the area thus infected has been converted into an undulating mass of crawling, rolling, burrowing maggots. Not content with living upon the exposed surface of the wounds, these worms, straitened in their crowded quarters, seek fresh pastures in deeper tissues, going to considerable depths.

During field operating little can be done against the fly pest. Small smoke fires kindled to windward of the operating table, or on all sides if the breeze is variable, will to some extent serve as a protection.

THE POISONOUS PRINCIPLE OF POISON OAK.

McNAIR (*Medical Record*, June 16, 1917) gives the following reasons for supposing the etiology of poison-oak dermatitis is not bacterial:

1. The incubation period, although it may occur in bacterial diseases, is in itself no absolute proof that the disease which it accompanies is bacterial. The incubation period is influenced by the dose, as can be easily proven by direct application of various alcoholic dilutions of the sap of *rhus diversiloba* on equal areas of skin and on anatomically corresponding places of the body.

2. Although immunity toward this poison may exist, no case has yet been proven when the fresh plant sap or its extracts have been directly applied to the skin. Nor has any artificial immunity been experimentally established.

3. Sensitiveness to many chemical irri-

tants is reduced or accentuated at times supposedly through a change in the physical resistance of the patient. Such a condition therefore constitutes no proof that bacteria alone may be thus affected.

4. Transmission of the disease from plant to person is not limited to the proximity of the plant. Actual contact with the resinous sap of the plant must occur. This can take place directly or indirectly—*e.g.*, the hands can carry the poison to such parts of the body that exterior clothing, etc., do not reach. The poison is not wind-carried unless by smoke, or possibly by dust and insects. The pollen is non-toxic.

5. The first appearance of the dermatitis may be on an area untouched directly by the plant, but not protected from subsequent indirect contagion.

6. Febrile symptoms accompany other diseases than those of bacterial origin. Febrile symptoms are the exception and not the rule in *Rhus diversiloba* dermatitis.

7. Dr. Von Adelung in experiments with rabbits and guinea-pigs was unable to secure either immunity or anaphylaxis. Ford considered at one time that he had established immunity to *Rhus toxicodendron*. Upon repeating his experiments, however, he was unable to secure successful results.

In the consideration of the validity of the non-bacterial etiology of poison-oak (*Rhus diversiloba* T. and G.) dermatitis, circumstantial evidence, such as the incubation period, possible immunity, and possible anaphylaxis, which do not positively prove either the bacterial or chemical nature of the poison, is of little value. (Immunity and anaphylaxis may be obtained by proteins of bacterial as well as non-bacterial origin.)

The principal poisonous constituent of *Rhus diversiloba* by direct evidence is non-bacterial, for: (a) No bacteria have been isolated from the interior of the plant which will cause characteristic rhus dermatitis. (b) No bacteria have been isolated from the surface of the plant which will cause characteristic rhus dermatitis. An uninjured leaf, petiole, or green stem when rubbed on the skin of a sensitive person

will not cause rhus dermatitis. Cultures on artificial media of bacteria from poison ivy (*Rhus toxicodendron* L.) by Burrill, and of bacteria from poison oak (*Rhus diversiloba* T. and G.) by Frost, have failed to produce characteristic rhus dermatitis. (c) No bacteria have been isolated from the serum of rhus dermatitis vesicles and cultivated which are capable of producing rhus dermatitis. (The presence of any bacteria in the serum may be due to secondary infection from scratching, etc.) (d) Serum from rhus dermatitis vesicles when rubbed on the skin (which may even be lacerated) of a susceptible individual will not cause rhus dermatitis. (e) Rhus dermatitis has only been successfully experimentally caused by direct contact with the resinous sap or sap products and the smoke from the burning plant. (f) Unlike bacteria, the poisonous principle of the sap is immiscible with water, glycerin, rabbit, ox, and human serum. (g) Unlike bacteria, when the sap is mixed in equal volume with 1:500 bichloride of mercury and kept for forty-eight hours the mixture is still poisonous. (h) Unlike bacteria, when the sap is heated to 210° F. for two hours it will still produce rhus dermatitis.

RECENT ARTICLES ON WAR SURGERY.

ALLISON in a clinical abstract (*Interstate Medical Journal*, April, 1917) quotes Eynard, who reports 124 cases, and writes a defense of the technique of the total removal of comminuted bone fragments, saying that this method of treatment is quite general among the French. He gives as his reasons that it is better to remove a little periosteum than to leave a single denuded fragment in a wound, and that for one piece of loose bone that will live there are many that will die and form sequestra. His operations were done within fifteen hours after the wounds were received, and his cases were evacuated from his hospital wearing plaster casts to immobilize the fractured area. He has had out of 25 forearm fractures 24 that had no complications. He followed them for a period of

four days. In 34 cases of shaft fracture of the humerus one died and there were four amputations, and two were followed for a period of four weeks. In 50 cases of leg fractures there were six amputations; nine cases were followed ten days, and three up to the time of union—four weeks. In fractures of the femur there was one death and one amputation in 15 cases. In the whole series of 124 cases there were two deaths and eleven amputations.

The interesting part about this paper is that the writer does not give or attempt to give any estimation of the ultimate results obtained. Of course the paper is of little value, except in the sense of pointing out what not to do in these cases.

The other paper is written by Cotte. This writer states that subperiosteal removal of bone fragments is the only method of preventing or curing infected open fractures and saving the limb. He notes that before the war this practice was condemned by most surgeons, but since then its value has been abundantly demonstrated. He allows that this procedure might result in pseudarthrosis, but believes it prevents this by putting the periosteum in healthy condition, and also it opens the medullary canal and guards against chronic infection of the shaft of the bone.

He reports 41 humerus fractures, 28 forearm fractures, and 46 leg fractures, making a total of 115 cases in the series. In these there were twelve amputations. In 81 of these primary removal of bone fragments was resorted to. In the same way as Eynard, he gives the ultimate results in only four cases out of 115, making his series of observations practically valueless.

In discussing these two papers it may be said that perhaps the most valuable surgical observation that has been made on the injuries sustained in the present war has been the observation that these compound comminuted fractures had best be treated with a high degree of conservatism. Bone fragments that seem detached and valueless have been shown by numerous observations to be perfectly viable, and have

aided in the establishment of union and the reforming of normal anatomical contour in the shaft of the shattered bone. So much so is this the case that it is deemed very bad surgery by most men who have had experience in base hospitals to remove bone fragments at all. The essential requirement is to establish free drainage and the clearing up of infection by proper methods of irrigation and continued drainage.

Bosquette recommends that the treatment at first-aid stations should consist of the injection of salt solution and camphor oil to improve the patient's general condition, that bleeding should be stopped, that the wound should be superficially cleansed by the application of iodine and hypochlorite solution, and that the fractured extremity should be splinted, preferably in a wood splint, strapped to the side of the stretcher. When the patient has reached the hospital he should be rested in a warm bed for at least half a day before any operation is done, other than an urgent one. He recommends for operation the removal of shell fragments and other foreign material, and also advises the removal of all bone fragments not adherent to periosteum, and the establishment of drainage. He insists on the reduction of fragments and on rigid immobilization of them, and for this purpose advises a plaster cast. His paper is written on fractures of the thigh, and he states that unfortunately, due to the necessities of war surgery, most of his cases were not followed up to their conclusion. He states that casts are not well adapted to this type of fracture in the thigh, and retrieves himself partially from the error made by the other two authors in the following statement: "It is doubtful whether the removal of all loose bone is advisable in every case, for in some of those badly comminuted cases it results in a gap of several inches between the fragments, which renders bony union impossible without subsequent grafting."

These three papers perhaps present a fairly well-established view-point which has gained a certain following by surgeons operating in hospitals back of the first-aid

stations. It has been the experience in such hospitals as the American Ambulance at Neuilly that cases coming from a certain district behind the lines were all treated in this way, whereas those coming from other sections had been simply splinted and partially drained with hemorrhage more or less perfectly controlled. The contrast between these two groups of individuals at the end of three months leaves no question of doubt as to the inadvisability of radical measures in comminuted fractures. Many bones that were extremely shattered after the infection was controlled healed with good union, very good alignment, and practically no deformity. It seems advisable to very forcibly emphasize this observation.

RESULTS OF SURGICAL TREATMENT OF GASTRIC ULCER.

BALFOUR (*Surgery, Gynecology and Obstetrics*, June, 1917), basing his conclusions upon 677 gastric ulcers operatively demonstrated in the Mayo clinic during the past ten years, emphasizes the following facts:

For ulcers at the pylorus, gastroenterostomy is the operation in the poor surgical risk, for pylorotomy is followed by better results, the operative mortality is distinctly less. The cautery is a useful adjunct in some cases.

For ulcers on the lesser curvature by the method described in a previous paper and gastroenterostomy is the operation of choice.

Local excision alone of such ulcers is inadequate, 32 per cent of patients operated on requiring further operation, viz., gastroenterostomy.

Sleeve or segmental resection, in large high ulcers and hour-glass ulcers, with traction, in suitable cases is not only a relatively safe operation but has been followed by good results.

The lowest operative mortality for the more common operations was attained with cautery and posterior gastroenterostomy.

Ulcers on the posterior wall are associated with the highest operative mortality. Those at the pylorus are of least risk.

REVIEWS.

A HANDBOOK OF PRACTICAL TREATMENT. By Many Writers. Edited by John H. Musser, Jr., B.S., M.D., and Thomas C. Kelly, A.M., M.D. Volume 4. W. B. Saunders Company, Philadelphia, 1917. Price \$7.00.

COMPLETE INDEX TO VOLUMES I, II, III, IV, OF MUSSEY AND KELLY'S PRACTICAL TREATMENT. W. B. Saunders Company, Philadelphia, 1917.

Our readers may recall that a number of years ago the late Dr. John H. Musser associated with himself the late Dr. A. O. J. Kelly in the editing of a text-book on practical treatment, or, as it would have been called some years ago, a system of practical treatment. Unfortunately the brilliant career of Dr. Kelly was cut short by diabetes, and, still more unfortunately, Dr. Musser, like many other overworked physicians, died from aortic disease, both of them before the book was fairly on its way.

The authors were however successful in obtaining a large number of skilled contributors and writers, and the desire for a present volume, edited by Dr. Musser and Dr. Kelly's brother, has been kept up to date the themes which were treated in the three volumes which made the work when it first appeared. And no less than 116 writers appear in the present volume, which at once make it even more comprehensive than the previous ones. Some of the papers must be very recent. Indeed, there is no necessity in the present volume, since the articles in the three volumes were of this nature. The deaths have occurred in the list of contributors new authors have attempted to bring the matter up to date, but in the present volume of instances the original contributors have added nothing new which they have

to their original contributions. In some instances the editors themselves have made such emendations in articles as seemed to them advisable. A number of illustrative charts are found in the volume which are definitely clinical in their nature.

The design of the index volume is described in its title, the intention being to present the subscriber to the four volumes with an index whereby he can turn for such information as he desires to any page in any volume.

POLIOMYELITIS IN ALL ITS ASPECTS. By John Ruhrah, M.D., and Erwin E. Mayer, M.D. Illustrated. Lea & Febiger, Philadelphia, 1917. Price \$3.25.

This very important topic, which was forced upon the profession so emphatically in 1916, is exhaustively and adequately considered in this contribution to the subject, which, with its bibliographies and indices, covers nearly three hundred pages. There are 118 engravings and two colored plates. The volume opens very naturally with a history of the disease, then our conceptions of the disease, its pathology, and the nature of its virus are discussed, and in the fifth chapter the epidemiology is considered. The various symptoms presented, more or less widely diffused as they are, are clearly described. The technique of lumbar puncture to aid in the diagnosis of the disease is given, and then follow chapters dealing with diagnosis, prognosis, and various forms of treatment by serum, orthopedic and operative measures, the final chapter dealing with muscle training, measures to be taken in an attempt to prevent the disease, and some anatomical and physiological reminders concerning it. The last chapter of all gives the dates of the various epidemics in different parts of the world up to 1911. So far this season poliomyelitis has been as rare as it was common last year, something which is to be devoutly thankful for, considering our very limited field of therapeutic procedure when a patient is stricken with it. In this book the reader will find practically everything that he can possibly want to know about the malady, so far as our present advances permit.

THE ROENTGEN DIAGNOSIS OF DISEASES OF THE ALIMENTARY CANAL. By Russell D. Carman, M.D., and Albert Miller, M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1917. Price \$6.00.

When we state that this volume of 558 pages contains no less than 504 original illustrations we are giving a pretty good idea of its characteristics and quality. This amounts to an illustration on almost every page. As a rule pictures showing conditions revealed by the x -rays are eminently unsatisfactory. Even if they are clear in the first few volumes which come from the press, the cuts become more and more clouded and less and less clear, but the authors and publisher in this instance are to be congratulated upon the fact that these illustrations are unusually clear and definite without having been so defined and touched up as to be distinctly artificial in their appearance. The volume, as its title shows, is devoted to the discussion of diseases and disorders of the alimentary tract as revealed by the x -ray. No attempt is made to deal with x -ray examinations of bones and joints, or of other parts of the body. The text reveals, as do the illustrations, a wide experience with a large number of interesting and important cases, and brief but important bibliographies are appended to a number of chapters, so that those who are interested may refer to particularly useful contributions made by others. The book is very handsomely printed, the heavy leading widely separating the lines, and the type is large. The quality of the paper would be considered unnecessarily heavy were it not that this heaviness is apparently essential in order that the illustrations may be well reproduced.

MATERIA MEDICA AND PRESCRIPTION WRITING. By Oscar W. Bethea, M.D., Ph.G., F.C.S. Second Edition, Illustrated. F. A. Davis Company, Philadelphia, 1917. Price \$4.50.

In this second edition of Dr. Bethea's book we are told that an effort has been made to bring the text up to date particularly with reference to pharmaceutical changes. Some new drugs have been added. The text is arranged alphabetically and, as the title of the book indicates, it is devoted

to materia medica and prescription writing rather than to therapeutics or a discussion of the application of drugs to the cure of disease. Almost all drugs of any importance have from one-half to one page and an illustrative prescription appended. To illustrate what we mean, we refer to the article on chloroform; after giving its Latin and English name, describing its physiological characteristics and giving its dose and the preparations made from it, only a little more than a line is devoted to its therapeutic action, and then less than six lines to its use. Under its administration, however, nothing is said of its employment by inhalation for the production of anesthesia, but a page and a half is given to prescriptions showing how chloroform in the form of the water or the spirit, or the chloroform itself, may be administered. About half a page is also given to a prescription showing how it may be applied externally for the relief of neuralgia and rheumatism. Curiously enough under cinchona only two lines are devoted to its therapeutic use, but one-third of the article is given to cinchonism and its relief, and under administration a considerable number of prescriptions are given showing how quinine may be employed. The book undoubtedly presents much which is of value, particularly if it is used in association with some standard book on pharmacology or therapeutics.

THE BABY'S FOOD. By Isaac A. Abt, M.D.
W. B. Saunders Company, Philadelphia, 1917.

In a little volume, of less than one hundred and fifty pages, Dr. Abt gives recipes, for the preparation of food for infants and children, designed to direct young mothers, nurses, and caretakers, and endeavors to give these persons information as to the minute details which are necessary in the preparation of foods for these classes of patients. "The Baby's Food" is an excellent little manual containing much practical information not only for the persons for whom it has been written but for physicians as well, who are often at a loss how to modify foods for either children or adults in such a way that they will be agreeable,

nutritious, and, at the same time, in the presence of disturbance of digestive system.

A MANUAL OF DISEASES OF THE EYES, for Dentists and General Practitioners. By H. May, M.D. Ninth Edition, translated. William Wood & Company, 1917. Price \$2.50.

We believe that we have reviewed favorably every edition of this little book, which made its first appearance in August, 1900. To have brought nine editions and to have kept it within bounds similar to the original edition during all these years has been a skilful editing on the part of the publisher, is illustrated by many colored and black-and-white diagrams, and is undoubtedly the best small book on ophthalmology which is extant, as the appearance of nine editions in seventeen years indicates. Ignoring all the objectionable qualities of the manual, nevertheless it deals with a large and important theme in a concise and efficient way. It is a book which every practitioner and the specialist will be glad to have.

DREAM PSYCHOLOGY. By Maurice M. D., B.C. Oxford University Press, New York, 1917. Price \$2.00.

The author states in his preface that the dream is so common an experience that it is not surprising that the analysis of the present age seeks to understand it, and, with this thought in mind, the author attempts to present his interpretation of dreams and the interpretation of the psychological processes as made by Freud, who he calls the pioneer of the analysis. The Zurich school and the Vienna school vary widely in their conceptions of the cause and character of dreams.

We do not think that this is a book which will prove interesting to many ophthalmologists. Like dreams themselves, it is characterized by a lack of definiteness. It will not appeal to the hard-working practical doctor; nevertheless, it presents a point of interest to those who are interested in the study of these fanciful conditions. It presents a brief but

referring to sixteen of the prominent contributions which the author thinks have a definite bearing on his theme.

MEDICAL CLINICS OF NORTH AMERICA. Volume I, No. 1, July, 1917. W. B. Saunders Company, Philadelphia, 1917.

It is proposed by the publishers to present every two months a volume containing reports of clinics given by different practitioners in the large cities of the Union. The present number is called "The Johns Hopkins" issue and covers about 200 pages, six medical clinicians making up the list of contributors, and dealing with a very considerable number of subjects. The clinics appear as lectures or conferences between students and teachers as in ward-class work. The next issue in September will be called "The Philadelphia Number," and we are told will contain sixteen articles by different Philadelphia clinicians.

MODERN DIETETICS. By Lulu Graves. The Modern Hospital Publishing Company, St. Louis, 1917. Price \$2.00.

The number of books which are now appearing upon the important subject of dietetics is very great. Some of them deal exhaustively with the problems of nutrition; others are more in the nature of cook-books. Those which are written by laymen, or laywomen, are usually of this type, and some of these books straddle the proposition and deal with it both from the standpoint of the cook-book and an attempt at a scientific discussion of the subject. This book is intended primarily to direct the feeding of the sick in hospitals and homes, but the author includes some studies on food for well people also. It contains nineteen chapters, the first of which, while homely in its nature, is, nevertheless, essential in institutional life in that it deals with proper methods of buying food and its judicious selection as to quantity, quality, and price, with a consideration of its storage and care, and a definition of what is a good cook. There then follows a discussion of the food value of certain products with the consideration of milk and its modifications, butter, its use and its substitutes,

vegetables, and breakfast foods, fruits, various drinks, and various types of meat and fish. The remaining chapters deal with the diseases in which special diets are particularly advantageous, as in tuberculosis. The volume contains a little over two hundred pages, is well indexed, clearly printed, and is a good practical manual for nurses and dietitians.

SHELL SHOCK AND ITS LESSONS. By G. Elliott Smith, M.A., M.D., F.R.C.P., F.R.S., and T. H. Pear, B.Sc. Longmans, Green & Co., London, New York, Bombay, etc., 1917. Price \$1, net.

The authors caution the reader that he should understand the term shell shock as indicating all those mental effects of war experience which are sufficient to incapacitate a man for the performance of military duties. They note that whatever may be the state of mind of a patient immediately after a mine explosion, the burial in his dugout, the sight and sound of his lacerated comrades, or other appalling experiences which finally incapacitate him for service in the firing line, by the time of his arrival in a hospital in England his reason and his senses are usually not lost but functioning with painful efficiency. It is in the emotional suffering that we must look for terms to describe the various conditions. There is an immense complexity of medical conditions and urgent need of obtaining and understanding the patient's past history before and during the war. The shock is often but the last straw.

It is noted that the most severe and distressing symptoms occur in the case of those patients whose past history shows that, far from possessing even the normal quota of timidity, they have been noted for their "dare-deviltry" and have been specially chosen as despatch-riders, snipers, and stretcher-bearers in the firing line.

Moreover, the seasoned regular non-commissioned officer may display the same symptoms as the raw recruit. He may have been in the army for many years and fought on previous occasions with great success. The general symptomatology is the protean one of neurasthenia.

As to treatment, isolation has a limited use. Suggestion and hypnosis are recommended as of great service at times. The value of work is insisted upon. Psychoanalysis is given greater importance. Finally, a psychiatric clinic is suggested.

A most readable book, and not without profitable lessons to all war surgeons.

COLLECTED PAPERS OF THE MAYO CLINIC, ROCHESTER, MINNESOTA. Edited by Mrs. M. H. Mellish, Volume VIII, 1916. W. B. Saunders Company, Philadelphia and London, 1917. Price, cloth, \$6.50 net; half-morocco, \$8.50 net.

Of the new books coming to the surgeon few, if any, excite more anticipation of pleasure and profit than these collected papers of the Mayo Clinic, since they go direct to the heart of things, deal intelligently and efficiently with problems presented to him, and set forth in complete and satisfactory detail the standard treatment for the conditions discussed. Herein are found Rosenow's papers on "Elective Localization of the Streptococcus from a Case of Pulpitis, Dental Neuritis, and Myositis," "The Causation of Gastric and Duodenal Ulcer by Streptococci," "The Etiology of Cholecystitis and Gall-stones and Their Production by the Intravenous Injection of Bacteria," "Elective Localization of Bacteria in Diseases of the Nervous System," "Epidemic Anterior Poliomyelitis."

William J. Mayo contributes a consideration of some of the maladies in which splenectomy may be indicated: "Radical Operations for the Cure of Cancer of the Second Half of the Large Intestine, not Including the Rectum;" "The Removal of Stones from the Kidney."

Charles H. Mayo contributes "An Appreciation of the Roentgen Ray and a Warning as to its Use in Surgical Diagnosis," "The Relative Merits of Cholecystostomy and Cholecystectomy," "Removal of the Right Colon: Indications and Technic."

Changes produced by the removal of the gall-bladder are considered by Judd and Mann. "Some of the Principles Involved in the Treatment of Patients Suffering from Obstructing Enlargement of the

Prostate," "Surgery of the Thyroid," "Transplantation of the Ureter Following Traumatism and Resection of the Bladder for Cancer," by Judd.

By Kendall: "The Active Constituent of the Thyroid: Its Isolation, Chemical Nature, and Physiologic Action."

By Balfour: "Cancer of the Uterus: Its Surgical Treatment;" "Indications for Splenectomy in Certain Chronic Blood Disorders;" "Results of Surgical Treatment of Gastric Ulcer;" "Splenectomy for Repeated Gastrointestinal Hemorrhages."

By Beckman: "Early Operation for Severe Injuries of the Head—Report of Two Cases of Meningeal Hemorrhage;" "Tumors of the Spinal Cord: With a Report of Eighteen Cases."

"Clinical Data on Nephrolithiasis," by William F. Braasch; "Clinical Data on Polycystic Kidney."

By MacCarty: "Errors in the Diagnosis of Mammary Conditions;" "Clinico-Pathological Nomenclature of Mammary Conditions."

Plummer on "The Function of the Thyroid, Normal and Abnormal."

Wilson on "The Pathological Changes in the Sympathetic System in Goitre;" "Model of Gastric Tubules in Early Gastric Cancer."

These and many other papers show the scope of the work, indicate its value to all familiar with the spirit which actuates the clinic, and are sufficient indices to the effect that neither the surgeon nor the physician can afford to be without this book, nor can he best practice his profession without the added knowledge which its study will bring him.

IMPOTENCY, STERILITY, AND ARTIFICIAL IMPREGNATION. By Frank P. Davis, Ph.B., M.D.C.V. Mosby Company, St. Louis, 1917.

Under this title Davis publishes a discussion of the sexual appetite in its relation to the sense of smell, sense of hearing, and sense of sight. Thereafter he considers Impotency, Masturbation and Emissions. Race Suicide, Sterility, Artificial Impregnation, and Therapeutics in General.

Davis states that he has attempted to blaze a new trail. He writes with some vigor and pays a tribute to Ella Wheeler Wilcox, whom he says describes passionate love better than any other writer. Dr. Guion is quoted as authority for a sure remedy for sterility—i.e., that the woman should sing at the top of her voice during the copulative act. Under artificial impregnation a report is quoted to the effect that a western drug clerk in filling a prescription for some vaginal capsules filled one of them with semen, from the effect of which the young lady became pregnant. It is stated that by artificial impregnation many cases are relieved of barrenness.

Among the therapeutic remedies are mentioned gold, cannabis indica, cinchona, gaultheria, hops, hamamelis, nux vomica, cantharides, phosphorus, platinum, picric acid, potassium bromide, pulsatilla, saw palmetto, and many others, including zinc, incense, and yohimbin.

OBSTETRIC AND GYNECOLOGIC NURSING. By Edward P. Davis, A.M., M.D., F.A.C.S. Fifth Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia and London, 1917.

That there should be a fifth edition of this excellent book evidences its value to both the medical and the nursing professions. Indeed it is so rationally conceived and so clearly written that it is largely purchased by the laity, who thus are enabled to exercise an intelligent supervision over childbirth and its sequels.

After a preliminary chapter on Anatomy, Physiology, and Prenatal Care, Nursing of Normal Pregnancy is discussed in much detail. Thereafter follow sections upon The Nursing of Complications of Pregnancy, The Description of Labor and Preparations for It, The Lying-in Period, the Care of the New-born Child, and the Accidents of Pregnancy and Labor. Full details, from the nurse's standpoint, are given concerning obstetric surgery. Space is devoted to Nursing in Puerperal Sepsis, and Puerperal Mania. Thereafter the question of Partial or Mixed Feeding; Weaning; Artificial Feeding is considered at length; and The Care of Prematurely

Born Children; Disorders of Infancy and the Development of the Child.

The second part of the book is devoted to Surgical Nursing. After some introductory pages the examination of the patient is described at length, together with local treatment and general care.

Finally, gynecological operations and postoperative treatment are taken up.

The book ends with a chapter on Venereal or Specific Disease and an appendix containing the Dietary, Preparation of Surgical Supplies, Other Methods for the Preparation of Surgical Supplies, and Aseptic Precautions.

This whole work is extraordinarily comprehensive considering its size, is characterized by sound common sense, clear vision of the end to be attained, and the promptest and safest way to reach it.

THE TREATMENT OF EMERGENCIES. By Hubley R. Owen, M.D. Illustrated. W. B. Saunders Company, Philadelphia and London, 1917.

This book is primarily written for the instructors in first aid to the injured, for police and fire surgeons, for ambulance surgeons, for resident physicians, for nurses, and for those laymen who wish to make a more comprehensive study of the subject. It is written with simple directness and the avoidance of technical terms, which makes its matter entirely available to any man of ordinary intelligence. Its teaching is essentially sound, in accordance with the best practice of the day. The subject-matter covered includes Fractures, Contusions and Wounds, Hemorrhage, Sprains and Dislocations, Burns and Scalds, The Effects of Heat and Cold upon the Tissues, Asphyxiation, Drowning, Convulsions, Unconsciousness, Effects Produced by Lightning, Foreign Bodies, Antiseptics, Bandaging, Transportation, Poisons and Their Treatment, and Household Remedies.

The subject-matter is well covered in something under 350 pages. The illustrations admirably supplement the text. A thoroughly sound and practical book, which might well form the text of public school training.

CORRESPONDENCE.

ELECTRICITY IN THE TREATMENT OF GOITRE.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: My opinion of the value of electricity in the treatment of goitre is that the only types that can be considered as amenable to electrical treatment are the simple and exophthalmic goitres. The cystic and colloid types belong entirely to the field of operative surgery. Simple goitres may be reduced in size or made to entirely disappear by prolonged iodine ionization. By this is meant the electrolytic dissociation of iodine from potassium iodide and driven into the goitre by means of the negative galvanic current. A two-per-cent solution of potassium iodide is used and a pad of cotton or some other absorbent material saturated with it and placed over the goitre; a similar pad of larger size saturated with water or salt solution placed on some indifferent part of the body, preferably the nape of the neck or between the shoulders. A current of ten to fifteen milliamperes is employed, and treatments should be tri-weekly, with no less than one hour for each treatment. With persistence this treatment produces very positive results. Appropriate systemic treatment should be instituted at the same time, such as thyroid extract, and the ionic treatment may be supplemented by some preparation of iodine internally.

The *x*-ray may oftentimes produce a reduction in size of the thyroid, but I consider the ionic method safer, as the *x*-ray causes a harmful influence upon the parenchyma of the gland and the secretion. I have never seen any benefit from the use of the high-frequency current in this condition.

Exophthalmic goitre should be treated by iodine ionization, as treatment will be aggravated by its use. I should thyroid extract be used for other reasons, although I have seen this made. Plain, negative galvanism may be employed directly to the goitre, with the negative pole directly opposite at nape of neck, with some hope of systemic relief. The improvement of the tachycardia and the general prostration. These symptoms sometimes recur when treatment ceases. The faradic current, static wave, high-frequency vacuum tube, and diathermy current oftentimes produce the same results. The *x*-ray may be used alternately. How the treatment acts is unknown, but a possible explanation is an alteration of nutrition of the thyroid itself, plus the stimulation of the vagus, thus inhibiting the secretion.

The *x*-ray, however, properly used, is far and away the best *physica* method for the treatment of exophthalmic goitre for it acts directly upon the gland, reducing the secretion. By its use the condition may often be restored to normal, the tremors disappear, the gland is reduced in size, and general health is improved. The exophthalmos, however, is not influenced as much as the other symptoms. The *x*-rays do not work in all cases alike, but it is my conviction that in all cases should be treated by this method with the hope of success before resorting to operative surgery.

Very truly yours,
W. L. CRITCHFIELD

Lecturer on Electrotherapeutics,
Medical College.

PHILADELPHIA.



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ORIGINAL COMMUNICATIONS.

TREATMENT OF CHRONIC BRIGHT'S DISEASE.*

BY J. M. ANDERS, M.D., LL.D.

Professor of Medicine in the Post-Graduate School of Medicine of the University of Pennsylvania.

There are two principal criteria which should serve to guide us in the treatment of chronic Bright's disease. They are the general condition of the patient as it is influenced by the progress of the affection, and the rate of metabolic excretion as determined by modern methods of examination. We should also pay due regard to the results of clinical and microscopical studies of the urine, although in my experience both albumin and tube casts have, at times, shown a tendency to increase under a judiciously restricted diet on the one hand, and to remain uninfluenced by a pretty generous diet on the other.

Without stopping to attempt to remove the touch of vigorous professional confidence in the percentage of albumin and the number and variety of tube casts as an index to the severity of the morbid process, and making it the foundation for prognosis and treatment, I feel that we have depended too exclusively on this somewhat uncertain standard in the past.

I propose considering the two criteria mentioned above for a moment separately so far as practicable, believing that most light may be thus thrown on the present-day means of dealing with this important disease.

The Rate of Metabolic Excretion.—This must be gauged by the most modern and approved methods. The amount of urea

excreted in the twenty-four hours is an indication of the outcome of the case, and should be carefully and repeatedly estimated.

Among the substances excreted with great difficulty by a diseased kidney is creatinin. In this connection it is of great interest to note that Myers and Lough have shown that an estimation of the blood creatinin is of prognostic value—*e.g.*, over 5 mg. per 100 Cc. of blood having invariably terminated fatally in from a few days to two months, while figures from 3 to 3.5 mg. are to be regarded as decidedly unfavorable. It is essential, therefore, that substances which, like urea, creatinin, pigments, hippuric acid, and phosphates, are excreted with difficulty should be allowed in minimal amounts in Bright's disease. To avoid the ill effects of phosphoric acid, Von Noorden¹ recommends that calcium carbonate be added to substances containing it.

The test meal for renal function probably gives the earliest evidence of diminished kidney efficiency. Mosenthal and Lewis² hold phenolsulphonephthalein excretion and Ambard's coefficient are tests which enable one to follow most minutely the progress of renal disease.

The General Condition of the Patient During the Progress of the Disease.—While seeking to afford protection to the diseased kidney by extreme moderation in diet, especially in proteins, due attention is

*Read before the American Therapeutic Society at New York City, June 1, 1917.

to be paid to the matter of avoiding deleterious effects to all other organs—to the metabolism. The strength of the patient is to be preserved by adapting sound hygienic, therapeutic, and dietetic principles to the individual case.

Extremes of mental and bodily activity are to be avoided and the habits and mode of life of the patient regulated, the aim being to maintain the nutritive equilibrium, without producing irritation of the renal epithelium. All noxious substances entering into the etiology must be avoided and removed as far as possible. Primary foci of infection, *e.g.*, in the teeth and tonsils, should receive particular attention. By diminishing or removing such irritants as uric acid, alcohol, lead, and the like, the cardiovascular system is also conserved—a point of vital importance. The coöperation of the patient is always necessary to the end that the directions given shall be carried out persistently and faithfully.

The value of a change of residence to a warm, dry, and mild climate, in many cases of the chronic interstitial form of Bright's disease, is undoubted. The variability and humidity of temperate climates, particularly during winter, are aggravating factors in this disease, while a sea voyage or a sojourn at some resort where the soil is dry and sandy and the climate warm and equable may be highly beneficial.

Diet.—The chief control of chronic Bright's disease resulting from treatment is found in diet, coupled with the foregoing suggestions pertaining to the mode of life, rather than in drugs. The dietary restrictions should be both quantitative and qualitative. I quite agree with Shattuck³ that a varied diet is more likely than a monotonous one to promote the making of good blood and improving the general nutrition, and that of the myocardium in particular.

An excess of protein, which is always harmful, can be avoided only by a close study of the functional capacity of the kidney at short intervals of time, and the repeated estimation of the urea and creatinin content of the circulating blood.

By pursuing such a course it is found that oftentimes greater latitude may be extended without injury to the sick kidney, and thus aid decidedly the general metabolism. In this connection the view of Foster and Davis,⁴ to the effect that in cases in which there is no great amount of edema we must allow considerable water, the while we diminish the protein intake, in order to eliminate the solids and retained nitrogen, is sound and to be adopted.

On the other hand, when dropsy of a more marked degree is present, the fluid intake should be restricted to a total daily amount not exceeding one liter. In this class of cases, composed largely of instances of chronic parenchymatous nephritis, a salt-free, or what is more practicable, a salt-poor, dietary is a most useful adjuvant to efforts at removing the edema.

Whilst whole milk should make up a considerable portion of the diet, Von Noorden has pointed out that milk contains on the whole too much protein, and recommends that it should be restricted to three pints a day, to which a pint of cream should be added. The writer has found skim-milk and buttermilk, in appropriate quantities, of signal value in cases in which dropsy is marked.

Recently, Terwaert and Van Lier⁵ have put forth the claim, based on their experiments and clinical experience, that restriction to a milk diet in cases of nephritis with retention of urea is decidedly harmful.

In general a mixed diet will be of advantage: proteins in quite limited amounts,* greens, fruits (especially fruit juices), pure fats, and light, well-cooked farinaceous dishes and cereals (except oatmeal) may be allowed. Cocoa may be used as a beverage at the morning meal. The effect of a given restricted dietary is to be noted by making careful observation of the bodily weight and of repeated tests of the functional capacity of the diseased kidney, as well as of the urine and the urea and creatinin content of the blood.

*While from 80 to 100 gm. of nitrogen daily are required, it is often advisable to allow much less, even as small an amount as 5 gm. for a week or two.

In the writer's view it is no less important to the welfare of the sufferer from chronic Bright's disease that the metabolic processes be watched than to protect by an appropriate diet the chronically "sick kidney" with a view to maintaining, as far as possible, its functional equilibrium.

Drugs.—Drugs, while not curative, may counteract certain dangerous tendencies resulting from interference with kidney excretion. In the exudative variety, in which anemia is often pronounced and progressive, a chalybeate course from time to time is useful. In this form anasarca is also present and calls for treatment. The patient should be put to bed, where he should remain until the circulatory equilibrium is restored, while at the same time cholagogues, diuretics, and diaphoretics should be given.

Saline cathartics, exhibited after the Matthew Hay method—*e.g.*, in concentrated solution in the early morning so as to produce two or three watery discharges daily—are useful. Mercury, in all of its forms, is to be omitted, since it has been shown that this drug has a selective affinity for the kidney and is, therefore, harmful in its effects in Bright's disease. Unfortunately, the custom of prescribing a mercurial preparation at intervals in this complaint, especially when edema is present, is only too common, but it should not be approved by the medical profession.

Again, one of the main aims of treatment is to spare the renal epithelium irritating substances, hence such diuretics as caffeine, theocin, sodium acetate, and other members of the purin group should be abandoned in the therapeutics of this disease. On the other hand, we may employ for their diuretic effects unirritating substances, as digitalis, and the salts of potassium, especially the citrates, either singly or in combination.

Active diaphoresis, especially if induced by means of hot-water baths, or hot, wet, or dry packs, is a potent factor in lessening dropsical transudates and the albuminuria, if persistently carried forward at intervals of twelve or twenty-four hours.

In cases in which the renal lesions have not reached an advanced stage, the writer has observed excellent results from a course of the hot Nauheim baths, which markedly enhance elimination through the skin and kidneys.

The Karell diet or the Karell cure is warmly advocated by Goodman⁶ and others. The technique is simple: "The patient receives daily at 8 and 12 A.M., and at 4 and 8 P.M., 200 Cc. of raw or boiled milk, warm or cold, according to taste." If great complaint is made, because of thirst, the patient may be allowed to rinse out his mouth with water, with instructions, however, that none be swallowed. It is customary to continue this strict diet in cases of renal edema for a period of one week, after which it may be gradually relaxed.

No aspect of the therapeutics of Bright's disease has engaged the attention of the profession to so great a degree as that of the associated hypertension. The lesson has not been learned as yet, when active interference with this oftentimes compensatory mechanism should be commenced. It is to be recollected that while high systolic and diastolic blood-pressure is a constant symptom of chronic interstitial nephritis, if we except the arteriosclerotic kidney of the aged, the inflammatory parenchymatous form, so long as it is compensated, exhibits no increase of blood-pressure.

Says Engel,⁷ the theory that ascribes nephritic hypertension to the chronic parenchymatous variety of renal diseases rests upon confounding it with cardiac hypertension. In approaching the question of the management of the hypertension, it is well to keep in remembrance that in the renal type of hypertension, including evidences of damage to the vascular system, an unfavorable prognosis appears to depend, as pointed out by Stone, upon the height of the diastolic pressure, to which rather than to the systolic our closest attention should be given, since it should form a guide to aid our efforts to reduce high tension. In view of the presence of a greatly increased diastolic pressure, myo-

cardial exhaustion supervenes, resulting in decreased urinary output, and symptoms due to increased retention of urea, leading in some cases at least to a fatal termination.

On the other hand, cerebral deaths, due to the greatly augmented diastolic pressure, are more common than myocardial deaths. It follows as a natural corollary that by a reduction of the high diastolic pressure we not only relieve such features as headache, vertigo, and so-called renal asthma, but also and more importantly, rupture of the cerebral arteries—an accident that often terminates life abruptly. This indication is to be met by the cautious use of nitroglycerin in ascending doses, beginning with 1 minim every three hours. In this manner we also relieve the heart of a serious strain, which is the result of a greatly increased tension and may lead to myocardial exhaustion.

My experience of the use of hot baths, in selected cases, accords with that of Rowntree,⁸ who states that a drop of 10 to 20 mm. often persists some time after a hot bath that results in a good sweat.

While affording therapeutic assistance to meet high tension, the effects upon the heart, the urinary output, and the urea and creatinin content of the blood must be noted. A too great reduction of the arterial tension, a prevalent mistake, is undesirable, being attended with danger of uremia and serous transudates owing to insufficient urinary excretion.

Myocardial exhaustion, which manifests itself in the terminal stage of cirrhotic kidney, with signs of cardiac dilatation, scanty albuminous urine and anasarca, requires heart tonics and stimulants. Here digitalis has good effects; it improves the myocardial tonus and often decidedly increases the urinary output, both as to fluids and solids, for a season at least. With the digitalis a small dose of nitroglycerin may be combined if the peripheral tension be high.

If, despite the treatment described above, definite uremic manifestations, more particularly vomiting, muscular twitching, convulsions, or coma supervene, vigorous measures are to be resorted to with all

possible expedition. Starvation for three days is advisable. Prompt action followed by the use of normal solution given subcutaneously, 500 Cc., as recommended by Herrick, gives much temporary relief.

The writer has observed good results from the subsequent employment of the Murphy drop method of administering normal solution, preceded by colonic flush, catharsis and active diaphoresis secured in the manner above described.

Inhalation of chloroform, or, often a useful and, the writer believes, an essential measure, the hypodermic injection of morphine, is to be employed in doses of from gr. 1/6 to 1/4, and according to the indications of the particular case. White and Wilcox have shown that morphine does good in uremia, by diminishing the oxidizing tendencies of the body metabolism. Dr. LeFevre lauded chloral, and the writer has observed gratifying results from its use in half-drachm dosage thrown into the rectum at intervals as required.

Time and space do not permit the presentation of the treatment of complicating conditions and symptoms in chronic Bright's disease, but those that come from consideration here must be treated in accordance with accepted therapeutic principles.

Kidney Organotherapy.—This method of treatment has recently received considerable attention, but it has not had time long enough to permit of a proper evaluation of its value. Sajous¹¹ claims that favorable results have been reported in about one-half of the cases of chronic nephritis in which kidney preparations have been tried. One may use a maceless preparation have Page and Dardelin,¹² or more conveniently a tablet known as nephrophen, prepared in this country by Reid and Herrick. The dose of the latter is fifteen 5-grain tablets daily, given between meals. Kidney preparations produce several effects, of which the most important are three: (a) The prevention of (b) a reduction in the percentage

min; and (c) increased diuresis. It is not improbable that nephritin and other kidney preparations owe their stimulating effect upon the urinary output and their antitoxic power to an adrenal principle in organic combination.

Salvarsan has yielded encouraging results in cases of syphilitic origin. Perhaps the only prerequisite to a fair degree of success in the use of salvarsan or neosalvarsan is the selection of cases in the earlier stages of this form of nephritis, since no drug "can possibly restore destroyed renal parenchyma or transform fibrous connective tissue into secreting kidney cells."¹³

Surgical Treatment. — The percentage of cases in which surgery—i.e., incision of the capsule or cleavage of the cortex—serves a useful purpose is probably small, and it is gratifying to note that the ardent advocates of these operative procedures are far less numerous than they were a single decade ago. It is conceivable that a splitting of the capsule or mere puncture of the same will diminish normal tension and thus relieve pain which may be present. Moreover, for hematuria, or particularly if practically limited to one side, "the operation should be recommended, as it has been frequently followed by cessation of the hemorrhage in chronic Bright's disease" (Newman¹⁴).

As a rule, the good effects of operation

are only temporary, the result of an improved circulation which, however, cannot be long maintained. Surgical methods cannot modify the nature and progressive character of a chronic nephritis, cannot arrest nor even appreciably retard the renal and arterial fibrosis and their mechanical consequences. Finally, no form of treatment is, in a real sense of the word, curative that has not for its main aim an amelioration of the toxemic condition present and the removal of etiological factors in particular cases.

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PRELIMINARY REPORT REGARDING MINERAL OIL AS A VEHICLE.

BY JULIUS H. HOELSCHER, M.D., CHICAGO, ILLINOIS.

Mineral oil has the well-known property of passing through the intestinal tract unchanged. In addition it is not absorbed into the general circulation. These properties suggested that the oil might be utilized as a vehicle for medicinal substances such as iodine, chenopodium, scarlet red, bismuth salts, beta-naphthol, thymol, magnesia compounds, etc.; assuming these, like the oil, might not be absorbed and therefore open the way to obtain what has been so much sought after, namely, intestinal antiseptics or disinfection. The first substance

tried by the writer was iodine in its metallic state. The resultant mixture assumes a violet color and the iodine apparently is thoroughly fixed by the oil. The solution represented one grain of iodine to two ounces of the oil, and was given in half-ounce doses once or twice daily. The relative effect of the oil remains the same. The taste is slightly pungent, and this pungency may be overcome by drinking a glass of cold water with each dose.

The following cases were treated with iodinated oil. It is admittedly true that the

profession often is called upon to treat and diagnose cases of gastrointestinal disturbances that suggest the existence of ulcers and other chronic or acute lesions, but wherein no definite indications of ulcer, etc., are found.

For lack of more descriptive terms we are compelled to adopt the words gastrointestinal putrefaction, autointoxication, etc.

The urine offers much in connection with kidney lesions, but the feces are still far removed from offering convincing evidence of intestinal disturbances that are directly indicative of so-called autointoxications and putrefactions. A lifetime could easily be devoted to solving the microbic and chemical phases of feces and at the end leave much unsolved.

Mrs. D., aged fifty-three. Menopause eleven years ago. Had diphtheria three times, and for the last attack, which occurred five years ago, used antitoxin. Had brachial neuralgia six years ago, for which baths were used with apparently good results. No children and no miscarriages.

Present illness: Two years ago became aware of stomach disturbance; she would have two or three semiliquid bowel evacuations in quick succession, preceded by slight abdominal distress and pain. Had an operation for hemorrhoids three years ago. Gastric distress, such as uncomfortable localized pain, transient nausea, rarely vomiting, and pronounced gaseous distention occurred directly after meals and continued for three or four hours. The vomitus usually consisted of food remnants and an acrid sour fluid. Vomiting always brought relief. Refused at all times to diet, and shunned medical treatment on that account. Intestines are constantly distended with gas. Complains of a well-localized epigastric pain which is most noticeable at night and sometimes severe enough to cause sleeplessness. It does not appear to be a hunger pain, and there is no apparent connection between the taking of food and the pain.

Examination: No findings other than the following: Occasional cardiac extrasys-

tole, no valvular lesion or cardiac enlargement. Left kidney floating. Tenderness in epigastrium of moderate severity. No tumor or abnormal formation. Topography of the abdominal organs normal. Roentgen reveals gastric hypertonicity, spastic ileus, no obstruction.

Intestinal tract revealed no abnormal conditions. Feces showed mucus intermixed with bowel contents; no blood. Microscopic, occult, or macroscopic. Cultures were present a large variety of Gram-negative and Gram-positive microbes, with special type predominant.

The patient refused to diet and prefer her distress plus her social life and her avocations to restricted diet and changes of life. The only medication prescribed was the iodinated oil in half-ounce capsules at bedtime, and if no relief followed a second dose was to be taken at 10 A.M.

Over a year has elapsed and the patient reports occasionally, and claims to have secured relief. She is taking the oil capsules at night, at bedtime.

Mr. M., actively employed in a business camp and on a farm. History was negative regarding lesions that might bear directly or remotely on the present illness. An analysis of the dietetic habits indicates that he eats excessively of meat, butter, and bread. He noticed gradually increasing gas formations in the abdomen; no pain in the abdomen, no vomiting, and undisturbed appetite. He claimed that he had a daily bowel evacuation, but the history suggested that the evacuation was not sufficient as compared in connection with the food intake.

During the gas distention he had transient nausea, transient vertigo, tired easily, and lacked ambition. Sleep was undisturbed except pain at night. Finally the distention came so pronounced that severe pain appeared in the cardiac region and assumed an anginal character, causing the attack to suspect angina pectoris. Several attacks of syncope supervened. He never had used tobacco and alcoholic drinks, but drank in excess of coffee.

The examination was negative as a

to blood findings, urine, cardiovascular organs, nervous system, respiratory and genito-urinary organs. The nasopharynx and mouth were negative. X-ray revealed large gas accumulations in the stomach and splenic flexure of the colon. Delayed intestinal motility; no ulcer of the stomach or duodenum; no evidences of adhesions, malpositions, or tumors. There was no well-defined reason for suspecting either the appendix or the gall-bladder.

The stomach was moderately dilated and hyperacid. The feces generated gas to excess, but free from blood, pus, parasites, and ova. They contained some mucus and fatty acids. The microbes of the Gram-positive type predominated. The capsulated aerogenic gas organism was present.

The treatment consisted of selected diet and two doses daily of the iodinated oil—one at 10 A.M. and the other at bedtime.

Relief was prompt and has continued to the present time. This case has been under observation since last October.

Male, aged forty-seven. At fourteen years of age had articular rheumatism. At eighteen years of age had recurrent headaches that resembled migraine. Up to four or five years ago had recurrent tonsillar infections. In 1903 had an operation for mastoiditis, which healed in three months. Absolutely no history of syphilitic infection. Several years ago developed a mild tabes, for which he received mercurials and iodides. The disease was so mild that he was enabled to follow his commercial occupation without attracting the attention of others to the tabes. He particularly complained of the following gastrointestinal symptoms: About one hour after eating gases formed in the stomach and intestine and remained for three or four hours—often until the next meal. With the distention some pain and discomfort, and he assumed that the gastrointestinal disturbance caused periods of decided vertigo of short duration but quite annoying.

Purgatives brought relief, as constipation was a constant symptom. He had a normal appetite and used alcohol moder-

ately. He particularly favored potatoes and butter in the selection of food.

At this point note the fact that many of the intestinal putrefactions are determined apparently by excessive eating of potatoes, bread and butter, and faulty carbohydrate food combinations. Much might be written regarding the great importance of so arranging diets that the ration is well balanced. This much-neglected phase deserves attention, with particular reference to gastrointestinal disturbances.

Physical examination: Positive findings of tabes. No organic lesions discoverable. Blood findings negative. X-ray revealed normal topography and lessened motility. No pathognomonic signs of gastric and duodenal ulcer. Urine contained an excess of indican.

Feces: Gas content excessive; mucus intimately mixed with feces, undigested food remnants, no occult blood, no ova, and no parasites; fatty acids abundant. Gram-positive microorganisms largely increased; there were present rod-like forms large and small, capsulated forms, and few streptococcic types.

In this case the progress was slow but constant. He has been under observation about seven months, and now is free from distress. He took the iodinated oil at bedtime and followed the prescribed diet.

SUMMARY.

First. The iodine is not absorbed into the general circulation because all the known tests that were made to detect it in the urine failed to disclose its presence. This applies to those who had taken the mixture a few days and those who had taken it over six months.

Second. The iodine can be detected in the feces, in all cases—more so in those who had taken it for months.

Third. No indications of iodism or toxic effects appeared in any case.

Fourth. The maximum dose that can be safely given is open to investigation.

Fifth. The laxative effect of the oil is not modified by the addition of iodine.

Sixth. The indications for its use are to be found in intestinal autointoxications or intestinal putrefactions. These terms are used for lack of better descriptive words.

The writer's experience justifies the conclusions that the oil gives better results with the iodine than without—because observations made regarding the Gram-negative and Gram-positive microbic findings revealed a marked difference before and after taking—and the symptoms of autointoxication were favorably influenced. In gastric and duodenal ulcer the effects were often quite pronounced regarding the pain, hyperacidity, gaseous distention, and distress occasioned by food.

Particularly impressive is that of overcoming hookworm and intestinal parasites when the oil is combined with chenopodium, iodine, oil of guaiaccol, thymol, pelletierine, etc. If the oil is not absorbed one may give these rather toxic agents mainly through the gastrointestinal tract. This, however, calls for a considerable investigation.

Combined with bismuth subnitrate proved successful in a case of chronic mucous colitis; it disposed of the irritating effect of the bismuth and brought normal bowel and fecal action.

25 E. WASHINGTON STREET.

THE MECHANISM OF CARBOHYDRATE METABOLISM.¹

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Among the interesting problems that confront the physician from time to time is the successful treatment of a group of symptoms the chief of which is the appearance of sugar in the urine. The difficulty of successful treatment lies partly in the fact that the mechanism by which carbohydrate material is temporarily stored, subsequently released, and finally oxidized, is but imperfectly known; and partly in the further fact that the pathologic factors that disturb the normal action of this mechanism are not in some instances readily determinable, and even when determinable their modes of action are not always apparent.

The object of this paper is to present in as simple terms as possible some of the established facts regarding the mechanism by which sugar is stored, released, and finally oxidized. These problems, embraced under the term, metabolism of the carbohydrates, are of prime interest by reason of the fact that they are intimately related to that grave condition of persistent glycosuria seen in man to which, in connection

with other symptoms, the term diabetes has been given.

The Storage of Sugar.—At the present time the fact must be accepted that carbohydrates are consumed almost exclusively for the production of heat and the performance of work. This fact is well established by a long series of experiments carried out by physiologists and chemists.

Since the muscles are the organs most concerned in the production of work, as in the performance of work, it is a plausible assumption that the sugar as well as its oxidation is primarily for in the muscles themselves.

At the time of departure it may be assumed that the tissues have been depleted of carbohydrate material, and that on the next day the usual quantity, from 30 to 40 grammes (10 to 12 ounces), is digested, and converted, in the small intestine, for the most part into sugar, termed glycose, glucose, or dextrose, the chemic formula for which is $C_6H_{12}O_6$. Under this form² the carbohydrate

¹Paper read before the Philadelphia Clinical Association, May 15, 1917.

²Other sugars, such as levulose and galactose, to some extent during digestion, are also considered. They probably undergo after the same transformation that glucose does.

is absorbed by the epithelial cells covering the villi, and by them transmitted to the blood in their contained capillary blood-vessels. It is then transported by the blood stream, by way of the portal vein, to the liver. That this is the case is shown by the results of chemic analysis. Thus the blood obtained from the portal vein after the ingestion of a meal rich in sugar, shows a higher percentage of sugar than the blood obtained from any other portion of the circulatory apparatus.

On reaching the liver a large percentage of the sugar will in the course of the day be carried onward into the blood of the general circulation, and in a short time be delivered to the capillaries of the muscle tissues. On reaching this situation, the sugar being a highly diffusible substance will pass across the capillary wall into the surrounding lymph spaces, thence across the sarcolemma into the interior of the muscle cell, where it comes into direct contact with the cell material. Here through the action of an intracellular enzyme, the sugar is deprived of a molecule of water and is thereby transformed into a non-diffusible substance which resembles in its chemic relations vegetable starch. Under this form the carbohydrate material in part is retained until the necessity arises for its oxidation.

Inasmuch as this starch is subsequently again transformed by the addition of a molecule of water into sugar (glucose) before oxidation can take place, it has been termed glycogen, a generator of sugar. For this reason the muscle may be said to have a starch-forming or a *glycogenic* function, and a sugar-forming or a *glycogenetic* function. Chemic analysis has shown that muscles contain normally from 0.5 to 1.0 per cent of glycogen, and as these organs constitute about 40 per cent (28 kilogrammes) of the body weight (70 kilogrammes), they collectively generally contain from 140 to 280 grammes (6 to 10 ounces) of glycogen. As chemic analysis has failed to detect the presence of glycogen in the blood the inference is that it arises in the muscle cell itself in the man-

ner already indicated. From these facts it is apparent that the muscles are organs in which carbohydrate material is stored in very considerable quantity, hence it is readily accessible when the need for energy is pressing.

Coincidentally with the storage of sugar in the muscles a certain portion (10 to 20 per cent) of the sugar absorbed from the intestine is stored in the liver. As the blood flows through the capillaries of the liver, some of the sugar passes across the capillary wall into the surrounding lymph spaces, where it comes into direct contact with the liver cells. Here also, through the agency of an intracellular enzyme, the sugar is dehydrated (deprived of a molecule of water), converted into starch, and stored in the liver cells, where it presents itself in the form of hyaline masses which can be readily seen with the aid of the microscope.

Inasmuch as this starch is subsequently transformed into sugar (glucose) it, too, has been termed glycogen. For this reason the liver may be said to possess a glycogen-forming or a *glycogenic* function. Chemic analysis has shown that the liver contains from 1.5 to 4 per cent of its entire weight of glycogen, and as this organ weighs on an average about 1600 grammes it contains from 24 to 64 grammes of glycogen. On a diet rich in carbohydrates the glycogen may be increased to 10 per cent. The liver glycogen thus represents an excess of carbohydrate material not immediately needed for oxidation purposes.

The blood plasma also contains a portion of the absorbed sugar under the form of glucose, and is to be regarded as a normal constituent. The quantity present varies from 0.10 to 0.15 per cent. To this condition of the blood the term *glycemia* has been given. If the statement be accepted that the amount of blood in a body weighing 70 kilos is 3864 grammes (one-nineteenth of the body weight), the amount of sugar in the entire volume is at most about 5.8 grammes.

Though the muscles and the liver are the main organs concerned in the storage

of sugar, it is highly probable that many other organs are engaged in the same process, especially those in which growth and nutrition are active.

The storage or the assimilation of sugar is influenced to some extent by the activity of the posterior lobe of the pituitary body. Thus it has been shown by Cushing that mechanical and electric stimulation of the posterior lobe is followed by glycosuria, the amount of sugar excreted depending on the amount of glycogen in the liver. This is attributed to a discharge, in amounts greater than normal, of its internal secretion into the cerebrospinal fluid and subsequently into the blood. The effect of the excess of the secretion is to lower the normal assimilating power or capacity, and hence leads to an insufficient oxidation and elimination. If the stalk of the posterior lobe be clamped so as to prevent the discharge of the secretion the assimilation capacity rises. As a result a condition of nutrition is established, characterized by a general deposition of fat, suggesting a conversion of the sugar into fat. The assimilation of sugar is apparently regulated by the posterior lobe of the pituitary, since it is lowered by a hypersecretion and raised by a hyposecretion. The manner in which this is brought about is, however, unknown.

The assimilation of sugar is apparently influenced in a similar manner by the parathyroids. Thus when three of the four bodies are removed the tolerance for sugar is diminished, as shown by the appearance of glycosuria. The thyroids appear to be without influence in this relation.

The Release of Sugar.—The necessity for a release of carbohydrate material from the storage tissues, and more especially from the liver, arises from the fact that the circulating sugar which readily passes into the muscle tissues is promptly oxidized, and hence the sugar content of the blood rapidly falls below the normal and a condition of *hypoglycemia* is temporarily established. With the establishment of this condition the liver cells transform a portion of the glycogen into glucose by the addition of a molecule of water, and as the sugar is

highly diffusible, it passes across of the capillary vessel into the blood, thus restores the sugar content and brings it up to normal. This procedure continues until the necessity arises for the creation of a new supply of food material. From the foregoing fact the liver is supposed to possess a sugar-forming or a *glycogenic* function. To this transformation of glycogen into sugar the term *glycogenesis* has recently been applied.

The question now arises, by what mechanism are the liver cells stimulated to release the glycogen and transform it into sugar and discharge it into the blood in amounts just sufficient to replace the sugar oxidized, without giving rise to hyperglycemia and glycosuria?

That this process is to a considerable extent regulated by the nerve system is apparent from the effects that follow lesions of the nerve system, whether produced by pathologic processes, experimental procedures, or psychic states such as emotions, prolonged anxiety, etc. Whether the regulation is *direct* or *indirect* (i.e., through its action on the liver or through its action on the secretion of internal secretion)—e.g., adrenalin, hypophysis—is a subject of discussion and experimentation.

It is a well-known fact that if the floor of the fourth ventricle is punctured at a point between the origin of the acoustic and vagus nerves, near the middle line, glycosuria will be established in from one to two hours, and which will last from five to ten hours in the rabbit, and from three to five hours in the dog. Coincidentally with this an increased amount of sugar in the blood (hyperglycemia) and a higher percentage of sugar in the liver than is normal will be found. Apparently the initial step in this series of phenomena is an increased conversion of glycogen into glucose, in other words, glycogenolysis. This supposition is confirmed from the fact that the severity of the hyperglycemia and glycosuria is determined by the amount of glycogen previously present in the liver. If the percentage of glycogen is high, the r

glycosuria is pronounced; if the percentage is low, as it will be after a fast of several days' duration, the glycosuria will be slight or entirely wanting. The foregoing fact, together with other facts derived from the fields of pathology and clinical medicine, has led to the view that there is in the medulla oblongata a group of cells which through efferent fibers influence the production of sugar in the liver. From the further fact that the glycosuria is but temporary in character the inference is that the puncture stimulates rather than destroys these cells. This view is corroborated by the fact that a similar glycosuria is established by psychic states of an emotional character—*e.g.*, fear, and injuries to sensory nerves in different regions of the body. In either case the nerve impulses so developed in the cerebrum or in the periphery are transmitted to the group of cells in the medulla, which are then stimulated to increased activity.

The efferent pathway for the transmission of the nerve impulses is down the cord, thence through the splanchnic nerves to the semilunar ganglion, and thence by way of the hepatic plexus to the liver. That this is the pathway is shown by the fact that if either the spinal cord is divided above the level of the splanchnic nerves or the splanchnic nerves themselves are divided, puncture of the medulla does not give rise to glycosuria. On the contrary, stimulation of the splanchnic nerve, more especially on the left side, gives rise to glycosuria.

Since it has been shown in recent years that the injection of a certain percentage of adrenalin into the body is followed by a glycosuria, the question has arisen as to whether the nerve impulses developed by stimulation of the medulla or the splanchnic nerves pass (1) by way of the semilunar ganglion and its post-ganglionic fibers direct to the liver cells, thus exciting them to increased activity; or (2) by way of post-ganglionic fibers direct to the adrenals, exciting them to discharge a larger amount of adrenalin into the blood; or (3) by way of both systems of nerves. The following facts will serve to elucidate this problem:

The subcutaneous injection of one milligramme of adrenalin chloride per 1000 grammes of body weight will give rise to hyperglycemia and glycosuria. Stimulation of the left splanchnic nerve just where it sends branches to the adrenal gland gives rise to an increased secretion and its discharge into the blood, as can be shown in many ways. From these facts the deduction is made that the hyperglycemia and glycosuria are the result of an increase in the normal percentage of adrenalin in the blood, and this latter fact is due to splanchnic stimulation. This supposition is strengthened by the further fact that after removal of the adrenal glands, neither puncture of the medulla nor stimulation of the splanchnic nerve gives rise to glycosuria except in rare instances.

It is not to be inferred, however, that the mere presence of adrenalin in the blood is the cause of the increased activity of the liver cells, and hence of the hyperglycemia and glycosuria, for if the hepatic plexus is completely divided, thus preventing nerve impulses from reaching the liver, the increased percentage of adrenalin in the blood fails to produce glycosuria.

That another factor is present is apparent from the following: Stimulation of the hepatic plexus always gives rise to glycosuria when the adrenal glands are intact, but never after their removal. Hence the assumption may be made that the production of sugar by the liver is under the control of the central nerve system and by the route detailed in foregoing paragraphs, but only when a sufficient amount of adrenalin is present in the blood. The rôle assigned to the adrenalin is a heightening of the irritability of the terminals of the hepatic plexus, whereby arriving nerve impulses become more efficient in their action.

The strictly physiologic factors that maintain and regulate the activity of the cells in the medulla, and which in turn cause by way of the splanchnics a discharge of sugar from the liver, and in amounts just sufficient to replace the sugar oxidized, are but imperfectly known. Whether they are to be found in variations in the com-

position of the blood or in the play of nerve impulses transmitted from special regions of the body cannot with any degree of definiteness be stated.

The glycogen of the muscles is released and converted by intracellular enzymes into glucose during muscle activity, whereupon it undergoes oxidation and contributes to the production of heat and supplies energy for muscle work. During rest it reaccumulates by the conversion of glucose arriving in the blood stream, and which has been released by the liver.

The Oxidation of Sugar.—As previously stated the final stage in the metabolism of sugar is its oxidation to carbon dioxide and water with the liberation of its contained energy, largely in the form of heat. This is accomplished in the tissues generally, but to the greatest extent by far in the muscle tissue. The intermediate stages are, however, but imperfectly known, though the first stage is believed to be lactic acid. The successive oxidations due to the presence of enzymes in the muscle tissue are embraced under the term *glycolysis*. The glycolytic enzymes, however, appear to be incapable in themselves to initiate the changes. For if glucose is added to an expressed juice of muscle tissue and the mixture is kept at a suitable temperature, oxidation does not take place, but if an expressed juice of pancreas be added to the muscle tissue juice, oxidation of sugar is promptly brought about. From experiments of this character it has been assumed that the muscle enzymes are inactive and require the presence and activating influence of a specific material secreted and discharged into the blood by the pancreas, a material partaking of the nature of a hormone. This view is based partly on the effects which follow extirpation of the pancreas. When the animal survives this operation a glycosuria is soon established, followed by a series of symptoms resembling those observed in diabetes mellitus. If a portion of the pancreas be transplanted into the subcutaneous tissue and time be allowed for it to establish vascular connec-

tions, then the removal of the pancreas will not be followed by a glycosuria.

It would appear that in the absence of the pancreatic hormone, the sugar discharged by the liver into the blood, when transmitted to the muscles cannot undergo oxidation, and hence accumulates, giving rise to hyperglycemia and glycosuria. The influence of the pancreas in this connection has been demonstrated by Knowlton and Starling. These investigators were able to keep a normal dog, to keep the heart beating for several hours in a practically normal manner by causing the blood of the same animal to circulate through its own cavity and coronary system at the rate of about 100 Cc. every two minutes. To this blood glucose was added. At the end of the experiment of about an hour's duration, they found that the amount of sugar oxidized was on the average 4 milligrammes per gramme of heart muscle. On substituting the heart-lung preparation of a dog that had been rendered diabetic by the removal of the pancreas, it was found that the rate of consuming sugar was reduced to a minimum or altogether lost by reason of the absence of the pancreatic hormone. They then demonstrated that the heart of the diabetic animal acted as a sugar-consuming or oxidizing power. Feeding it with the blood of a normal animal, the consumption being in one experiment 2.9, 5.8, 8.1 milligrammes per gramme of heart muscle in three consecutive experiments. The deduction from these and other experiments is that the oxidation of the sugar is dependent on the presence in the muscle of a specific hormone or activating material secreted by the pancreas.

From the foregoing facts it is apparent that the mechanism by which sugar is stored, released, and finally oxidized is not only very complex, but also delicately adjusted. An impairment in the action of almost any part of the mechanism may lead to a more or less serious disturbance of sugar metabolism, and be followed by glycosuria more or less pronounced.

prolonged. Among the causes of the glycosuria may be mentioned the following:

1. An incomplete abstraction of sugar from the portal blood and its storage as glycogen in the liver cells. This may be due to an impairment in the functional activities of the liver cells or to the ingestion and absorption of sugar in amounts beyond the normal assimilation limit, or to a lowered assimilation limit by reason of a hypersecretion of the posterior lobe of the pituitary.

2. A too rapid release or conversion of glycogen to sugar on the part of the liver cells. This may result from an increased activity of the cells in the medulla, due to the arrival of nerve impulses from (a) the cerebrum as a concomitant of psychic states of an emotional character, such as fear, profound anxiety, etc., or (b) from other regions of the body due to serious injuries. Simultaneously there may be a hypersecretion of adrenalin.

3. An incomplete oxidation of sugar in the muscles leading as a result to a hyperglycemia. This may be the result of the absence of the necessary pancreatic hormone as a consequence of destructive organic disease, or perhaps an insufficiency in its production.

THE TREATMENT OF GAS POISONING.

HENDERSON and PAUL have studied these matters carefully and their results are given in Technical Paper 82 of the Department of the Interior. They emphasize how important it is to carry a man overcome by carbon monoxide into fresh air and remove his apparatus as soon as possible. For fifteen to twenty minutes thereafter it is beneficial to administer pure oxygen, or air considerably enriched with oxygen, by means of a tank, bag, and mask with valves that do not allow rebreathing. If the victim, though unconscious, is breathing in nearly the normal manner, he may be allowed to inspire the oxygen himself. If the breathing is slow and irregular, or has stopped entirely, as may be the case in sudden exposure to concentrated carbon

monoxide, artificial respiration by the Schaefer method, but with administration of oxygen, should be performed. The stronger the oxygen the sooner the carbon monoxide is displaced and the oxygen-carrying capacity of the hemoglobin restored. Even when only pure air is breathed the mass action of its oxygen is usually sufficient to displace the greater part of the carbon monoxide in an hour or even only half an hour, so that the oxygen-carrying power of the hemoglobin is restored sufficiently to meet the patient's needs. Practically all of the carbon monoxide is eliminated and the hemoglobin fully restored in three or four hours. This is facilitated by the rapid breathing, usually 30 to 45 times per minute, which such cases exhibit during recovery, and which is probably caused by incomplete combustion products formed in the tissues during the asphyxia and circulating in the blood for some hours thereafter, or by some long-lasting effect on the respiratory center.

In many instances the victim never recovers consciousness and dies a day or two later. Many physicians still hold to the belief (now completely disproved) that the prolonged coma is due to retention of the carbon monoxide, and advocate bleeding, infusion of oxygenated saline solution, transfusion of blood from some healthy person, and other active efforts at restoration. None of these procedures nor any known procedure aside from careful nursing and symptomatic treatment has been demonstrated in practice to be of any benefit. Recovery when it occurs is not due to them, but in spite of them. There is indeed no reason to expect them to be beneficial, for it is not retention of carbon monoxide but the results of the injury to the brain and other organs, caused by lack of oxygen supplied by the blood while the patient was breathing the gas, which is responsible for the prolonged coma and subsequent death or incomplete recovery. There is no known method of restoring tissues to normality after parenchymatous degenerations have once been initiated. Left to itself nature does all that can be

done to stop the abnormal processes. The man recovers completely if the asphyxia has not been too intense and prolonged, although in many cases men who have once been "gassed" exhibit a muscular weakness of the heart permanently thereafter. More severe cases recover only with the loss, partial or complete, of vision, power of speech, or with some other nervous defect.

The foregoing statements regarding the effects of carbon monoxide upon men are based principally upon the work of Dr. Haldane. The experience of the authors has confirmed them in every detail. Thus one of the authors has repeatedly in experimental work breathed air containing carbon monoxide until his blood was 20 per cent saturated. No vigorous exertion was made and no ill effects were experienced. Within two or three hours practically all of the carbon monoxide had been eliminated and he was as fit for vigorous exertion as before. This of course would not have been the case if any lasting deterioration in the hemoglobin of the blood had been produced. Furthermore, one of the authors has repeatedly examined the blood of persons overcome by illuminating gas in accidents at New Haven, Conn. In six successive cases in which a sample of blood was taken and examined not more than two hours after the patient had been removed to fresh air from the room in which asphyxia had occurred, the elimination of carbon monoxide was found to have been so rapid that in only a single case was the presence of a small amount in the blood still demonstrable. In all of these cases the blood had undoubtedly been saturated beyond the danger point of 60 per cent, yet two hours in fresh air had served to reduce the carbon monoxide to less than 15 per cent, the amount which the small pocket spectroscope employed was capable of distinguishing. Four of these cases died within 24 to 60 hours after the asphyxiation. One was a case in which a small percentage of carbon monoxide was detected two hours after removal to fresh air, but recovered completely. Another still exhibited profound nervous impairment a month later.

These observations are sufficient to demonstrate the unwisdom of treating patients who have been poisoned with carbon monoxide, in order to stimulate the formation of new red blood cells. The formation requires several days to become fully effective. In the majority of cases the patient's blood is practically fresh before the bleeding is performed. Cases of carbon-monoxide poisoning exhibit such wide variation in the severeness of the initial symptoms, the length of time required for recovery, and in the completeness of restoration, that it is difficult to establish conclusions regarding them from merely clinical or statistical evidence. Theoretically there is no treatment that would seem more likely to increase a patient's chance of recovery than treatment by bleeding.

The experience of one of the authors supplies the following cases: Three all Filipinos of approximately the same weight, and physique, were overcome by illuminating gas while sleeping in a room together. One was treated during the following day by withdrawing blood and injecting saline solution saturated with oxygen. For a second, a transfusion of blood from another and unpoisoned person was performed. For the third, no treatment was done beyond the ordinary provisions of good nursing. The first two died within the course of the two or three days following the asphyxiation. The third survived and when seen three weeks later had recovered only sufficiently to answer the questions regarding his name and where he came from.

Thus it appears that about all that can be done for cases of carbon-monoxide poisoning is to administer artificial respiration when the person's own breathing has failed, or is feeble, to administer oxygen as soon as more than half an hour, to keep the patient warm if the temperature has fallen, to give water to the system, preferably by hypodermic drip, and otherwise to give the best nursing and such symptomatic treatment as may be called for. Anything beyond this is more likely to do harm than good.

EDITORIAL.

PROPER DEDUCTIONS FROM LABORATORY RESEARCH.

On a number of occasions we have been bold enough to call attention to the prevalence of a tendency on the part of laboratory investigators to reach positive conclusions in regard to the action of remedies as the result of a limited number of experiments upon animals or an even more limited number of experiments upon healthy men. In a very large number of instances the conclusions arrived at contradict those which the profession has come to after many years of experience. The laboratory investigator without clinical experience and fortified by the belief in the accuracy of his instruments and methods has no hesitation whatever in expressing his belief that his clinical brethren, while perfectly honest, have, nevertheless, been woefully mistaken, when the chances are that laboratory technique has been correct but the sweeping deductions wrong. On previous occasions also we have expressed the feeling that laboratory investigation is to be encouraged by every means.

There can be no doubt that the results of laboratory investigation have corrected many errors and pointed the way to new methods, although, sometimes, having the glamor of scientific accuracy about them, they have been enthusiastically adopted with disappointing clinical results. One of the factors which stands in the way of laboratory investigation being directly applicable to clinical medicine is that animals are used, and that these animals are either in a state of health or, if diseased, are suffering from disease in which the measures used cannot be expected to exercise a favorable influence. The results obtained from animals may be of value, but their bearing must be given proper weight and direction. The observations of the clinician have been made in practically every instance in the presence of disordered function, or disease. and this very disorder

of function or disease causes the human organism to react differently to remedies than it does in health. This difference in reaction is too frequently ignored in the study of drugs, yet it is obviously important. Ehrlich, and many others, have shown how differently cells respond to stains when they are diseased and when they are in health. To such an extent is this true that the pathologist uses certain stains to determine that certain cells are diseased, since he has found by experience that these stains do not affect healthy cells. It is also true that different individuals react differently to the same agents, whether these agents be factors which induce disease or whether they be drugs designed to cure disease. In other words, the thing that the profession is to be most cautious about at the present time is "to make haste slowly" in the acceptance of positive laboratory findings, and on the other hand, not to be driven by the dogmatism of some laboratory investigators into an antagonistic and unbelieving frame of mind.

In the *Archives of Internal Medicine* of May 15, 1917, there appeared two articles which serve to illustrate our meaning. One of these is entitled "The Reflex Action of Volatile Irritants on the Circulation." The authors start out by making the statement that among the measures in common use in combating conditions of threatened or actual circulatory failure is the subcutaneous or intramuscular injection of volatile substances of a highly irritant nature, such as ether, alcohol, or camphor dissolved in ether, alcohol, or oil, and they add that the clinical use of these substances in shock and allied conditions is based not on exact experimental observation but on casual bedside impression and tradition.

We confess that we did not know that ether and alcohol were commonly given hypodermically for the purposes named. They then go on to state that as a result of both laboratory experiments and clinical

observation they have come to the conclusion that these substances do not act as direct stimulants to the circulation but cause a reflex action arising from intense irritation of sensory nerve endings, and they admit that this reflex irritation may be the cause of the rise in blood-pressure which is supposed to occur. They therefore undertook experiments upon cats. The animal's brain was removed under ether and the temperature of the animal maintained by an electric pad. Twenty minutes was allowed to elapse after decerebration in order that the shock of the operation and the effect of the ether might wear off. As the result of their investigations they reached the conclusion that volatile irritants are not direct vasomotor stimulants, that they act reflexly through irritation of sensory nerve endings. Further that their effect on blood-pressure is both slight and transient, and in conditions of abolished reflex irritability, as anesthesia, shock, etc., the volatile irritants are without effect on the blood-pressure; and finally, for these reasons, that their clinical value is questionable. It is of advantage to the clinician to know how remedies which he employs produce their effect, but from one point of view he cares little whether these remedies act by reflex irritation or by direct stimulation; the result is what he seeks. The conclusions in this paper, scientifically accurate as to detail in the experiments, should be that these irritants produce these effects in decerebrated cats. It is a far cry between the clinical observation that they often do good in human beings suffering from circulatory depression to their impotency in decerebrated cats. In other words, these experiments are of value as far as they go, but it is a mistake to attempt to prove that they indicate something far beyond their scope.

The other paper which has attracted our attention appears in the same issue, and curiously enough controverts an opinion which has been held for many years by the majority of the profession, although the subject is pathologic rather than therapeutic. In this paper M'Junkin reports a

study upon the human and animal after alcohol. He discusses some theories which have been advanced in regard to production of cirrhosis, and that for many years the excessive use of alcohol has been considered one of the chief causes of this disease. It is of interest to state, however, that he studied the livers of human beings who were known to be alcoholics, as well as the livers of dogs which received alcohol in doses which might fairly be considered toxic. The conclusions which are reached by M'Junkin are interesting, and if confirmed by other investigators, as they probably will, other work has been done along this line are to the effect that alcohol does not act directly on the liver to produce a cirrhosis, and, furthermore, that it not only does not produce a cirrhosis but it produces no worthy lesion whatsoever in the liver. Or to use his words in the closing sentence in his article: "So-called alcoholic cirrhosis is not produced directly by ethyl alcohol; that is, the liver is not injured by alcohol carried to it through the blood or lymph."

All research aids knowledge. The results which seem barren of practical value prove of infinite value later on, particularly if other studies reveal their importance. The point is to conduct and value each research, but not to let it disturb our experience until it is beyond doubt that the clinical observations have been erroneous.

RESPIRATORY ACTIVITY IN SURGICAL SHOCK.

Nothing interests the practical clinician and surgeon more than communication from laboratory workers as to methods which they may employ in the treatment of conditions which are grave and threaten life. So many of our plans of treatment have to be based upon empiricism that we welcome any investigations, or deductions from investigations, that seem to put our treatment upon a scientific basis.

Much has been published from

laboratories during the last ten or fifteen years in regard to surgical shock, and opinions amongst physiologists who have investigated these conditions have been as divergent as have been the opinions of some clinical surgeons and physicians. The present world war has already given us many interesting facts in regard to shock, and, when the opportunity arises, many additional facts will doubtless be published which will aid materially in a correct conception of this state. One thing seems to be fairly well assured, namely, that the view held by clinicians for many years, that surgical shock consisted in severe vascular relaxation, so that a man is bled to death into his own blood-vessels, is the correct one, and the measures instituted to prevent this stasis of the blood in great venous trunks have produced better results than any others.

One of the investigators who has been most sane and interesting in his investigation of this important subject is W. T. Porter, who, in the *Boston Medical and Surgical Journal* of May 17, 1917, points out that a very great fall in diastolic pressure may occur rapidly and speedily destroy the patient. He emphasizes the danger of the patient bleeding into his abdominal veins, and therefore advocates that the head be put below the level of the abdomen. He also recognizes the value of the intravenous injection of adrenalin in normal saline, but he realizes that this treatment contracts the arteries without making the great veins give up the blood stored in them. This blood must be taken from its ponds or wells by some mechanical means.

The most potent factor in aiding in the emptying of the great veins is the movement downward of the diaphragm whereby a negative pressure is produced in the thorax, and, as Porter points out, this respiratory suction is so great an aid to the circulation that a man with weak arterial tone would faint every time he stood up if it did not serve him. The point is, therefore, in cases of shock to produce powerful and complete contractions of the

diaphragm, and for this purpose Porter makes the rather startling suggestion that the patient inhale CO_2 . If pure CO_2 cannot be obtained the patient may be made to breathe in and out of a rubber bathing cap, whereby CO_2 accumulates in his blood, the cap being removed as soon as oxygen hunger appears, and then, after a few breaths of ordinary air, replaced. An accumulation of CO_2 in the blood acts as an efficient stimulant to the respiratory center, and this, in turn, causes complete contractions of the diaphragm, which results in the emptying of the great veins into the heart.

Porter states that he has not, up to the present time, had an opportunity of testing this method upon human beings, but in animals in which surgical shock had been induced and in which the diastolic pressure was dangerously low, he could by these means raise the diastolic pressure from fifteen to thirty millimeters of mercury. Of course, it is well known to physiologists that any slight increase in the CO_2 in the blood not only stimulates the respiratory center to greater effort, but also stimulates the vasomotor center so that there is a rise of blood-pressure. Porter adds to his interesting communication that he is now on his way to France, where he hopes to have opportunities of trying this method on human beings, and, if it proves as effective in man as it has been in animals, he feels sure that an easy method for the treatment of traumatic shock in man has been devised.

THE VALUE OF PERTUSSIS VACCINE IN WHOOPING-COUGH.

Vaccine therapy, having passed through the days when it was popular because of its novelty, has now perhaps approximated its proper level. We think it a fair statement that in many conditions it has been exceedingly disappointing, and we think it equally fair to state that occasionally it seems to work wonders, and then to disappoint us in a similar case by failing miserably.

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There are few diseases which have a higher mortality amongst children than whooping-cough, and there are few diseases in which such a host of remedies have been recommended and tried. The introduction of pertussis vaccine it was thought would serve materially in shortening the course of the disease and in modifying its symptoms, but it was evident at the very first glance that unless it proved singularly efficient it was doomed to failure, since repeated hypodermic injections in children are regarded both by the patient and the parents with a good deal of misgiving, and oftentimes the crying and screaming induced by the hypodermic injections precipitate an unusually severe paroxysm of coughing. It is, therefore, important to reach definite conclusions in regard to the exact value of this measure of giving relief, but it is probable that up to the present time such information is not yet at hand. Occasionally, a paper appears in one of the medical journals in which the author expresses himself as satisfied with the results which he has obtained, and the next week another article appears in which the results have apparently been disappointing.

This condition of affairs is to a certain extent represented by two papers which appear in the *Journal of the American Medical Association* of May 19, 1917. In the first of these, by Sholly, Blumm, and Smith, a report is given as to the results they obtained in the New York City Health Department during the late summer of 1916. They found by careful study that it was difficult to determine how much immunity is conferred by prophylactic doses of pertussis vaccine because so large a number of children seemed to be naturally immune. Thus, out of two hundred and forty-three families, the children of which were exposed to whooping-cough, seventy-seven families, or 31.6 per cent, exhibited immunity in some of the children, and in a series treated by Luttinger 29.3 per cent showed partial immunity.

As these authors point out, statistics to be of any value must be drawn from sev-

eral thousand cases, and observe and beware of impressions. They found that of all the cases the shortest course was run in the cases of vaccinated children, they conclude that more observations with more clinical observations with more cases for comparison must be had before any case can be considered made out. The curative and prophylactic value of pertussis vaccine.

The other article, contributed by Luttinger, upon "The Value of Pertussis Vaccine as a Curative and Prophylactic in Whooping-cough," reaches some more encouraging conclusions. He states that the results warrant the routine administration of pertussis vaccine for curative and prophylactic purposes. For curative purpose the best time for vaccine treatment is in the first or second week of the paroxysmal stage, that by its use the disease is markedly reduced in duration and severity. An interesting point which he makes is that subconjunctival hemorrhages occur and are successfully treated by prophylactic use, and as in these cases the paroxysms are modified or prevented, this fact would seem to indicate that the hemorrhages are due to the violence of the coughing and some specific influence of the vaccine upon the conjunctival vessels.

ANAEROBIC WOUND INFECTION

To the American surgeon, since he is soon to be called into active service, he will deal with these affections, although the anaerobes, particularly the clostridia which cause gas gangrene, are of immediate and prime importance. Thus it appears that Ivens's communication (*Transactions of the Royal Society of Medicine*, February, 1917), though the exact figures have not been so large perhaps as some writers, is worthy of note, because of the careful study given this subject. He observes that the highest number of gas gangrene cases was reached in July, 1916, and that out of 127 wounded a

during twenty-four hours gas gangrene infection was present almost without exception. Under circumstances such as these bacteriological studies were not always feasible. Smears, however, were stained and scoped and a provisional diagnosis was based on the finding of many Gram-positive bacilli. This bacteriological blacklist coincided closely with the cases which went up for immediate operation from the wards, which was not surprising since we know that all pathogenic agents of gas gangrene, such as *Bacillus aerogenes capsulatus*, *Bacillus perfringens*, *Vibrio septique*, *Bacillus oedematiens*, and *Bacillus fallax*, are all Gram-positive when examined in the discharge fluid.

According to Agnes Savill the *x*-ray shows not only the projectile and fracture, but a special tracery, streaking or striation, associated with the presence of gas in or between muscle fibers. Some special characters even help us to differentiate between the fatal *Vibrio septique* and the more innocent *Bacillus sporogenes*. The *x*-ray plates may show a virulent infection in the deep muscles, which demands radical treatment while still localized.

There are many wounds where the gas-producing microbe is present without any gangrene, and with only a trace of gas infection. These microbes, being largely of intestinal origin, are specially associated with the fecal contamination of skin, clothing, and soil. Their virulence is increased enormously by the presence of streptococci. Although the numbers of wounds of the upper limb and chest are greater than those of the pelvis and lower limb—viz., 299 to 197—yet the mortality is three times as great among the gas infections of the lower limb as among those of the upper, viz., 31 to 10 (including three from tetanus). The nearer the soil the greater are the possibilities of infection.

The general proportion of shell to bullet wounds is as 2 to 1. In cases of gas infection the proportion is as 3 to 1, and in cases of gas gangrene the proportion has been 6 to 1, due probably to the infected piece of clothing which the jagged shell

carries in, and the greater destruction of tissue. In nearly every case of severe gas infection a foul-smelling piece of cloth can be found in the wound.

Occasionally, more especially after transport, quiescent cases flare up with signs of acute infection. The *x*-rays show no projectile, but one finds in the depths of the wound a piece of infected capote. The infection has probably been kept under control by the use of strong disinfectants, but breaks out when there is a prolonged interval between the dressings.

In some of the worst cases of gangrene an interval of several days had elapsed between the infliction of the wound and the first surgical intervention. In contrasting the gravity of these cases nothing has been more remarkable than the influence of this interval, other conditions being equal. After an attack at the end of May, 1915, the cases came in unusually early, indeed after a few hours. The wounds were very similar in character to others coming in on other occasions after a longer lapse of time, but the results were immeasurably superior, and not a case of massive gas gangrene nor a death occurred, although gas infection was prevalent. Whereas when suitable surgical treatment is delayed even a slight flesh wound may be fatal in the presence of a virulent infection.

Vascular lesions have an important influence in the production of gangrene. With complete blockage of the circulation a suitable soil is prepared for gas gangrene, though the gangrene is not necessarily due to the gas infection. It is obvious that such conditions favor the rapid development of gas organisms. Twenty-two cases of gas infections with vascular lesions have been noted, of which six only have been followed by gangrene.

Ligature of an important artery or vein singly does not seem to increase the incidence of gas gangrene noticeably. Wounds which affect both venous and arterial channels are more serious. In two cases of ligature of the superficial femoral artery, and in two of thrombosis of the femoral vein, no gangrene occurred. In four cases

of ligature of the popliteal artery gangrene occurred in one only. In three cases of ligature of the brachial artery no gangrene occurred; in one where both artery and vein were injured there was gangrene; in another, thrombosis of the artery occurred as a secondary result of the infection.

The complication of the wound by a bone lesion increases the incidence of gangrene. In 464 cases infected by gas organisms, at least 60 per cent were complicated by fractures.

Wounds of the calf involving the vessels, with or without fracture, are dangerous unless treated early and energetically. There is a tendency to the accumulation of gas and pus under the deep fascia and to increased absorption and spread of infection. In the same way wounds implicating the trunk, hip-joint, or pelvis are grave because the opportunities for free drainage are limited. Even a mild gas infection may lead to a fatal termination in such a situation.

Increased intramuscular tension is a powerful factor in the transition of a gas infection to gas gangrene. Where the wound of entry is small or closed the bacterial products accumulate under tension. The muscles involved tend to become gangrenous early from arrested circulation due both to pressure and absorption of toxin. When the sheath bursts gas spreads very rapidly in the subcutaneous tissues.

Tight bandaging, and more especially plaster-of-Paris splints, act in a similar manner. Some of the worst cases of gangrene have arrived with the fractured limb encased in plaster, with the swollen tissues bulging above and below. The French *gouttieres* are not attended by this danger, and for transport of freshly wounded soldiers are very useful and comfortable. The one flaw in the favorite Thomas splint lies in the pressure from the shoulder or thigh ring.

Joint injuries, while considerably increasing the gravity of the case, do not seem to have any direct influence in the production of gas gangrene. Among cases of

massive gangrene a joint lesion was in under 20 per cent.

Dr. Weinberg, of the Pasteur Institute, and his colleague M. Seguin, were able enough to study in detail the flora of a considerable number of cases, and from their expert knowledge of this very branch of bacteriology were able to give not only information of the greatest value but also serum specially prepared against some of the different forms of anaerobic organisms, to the employment of which the author refers later.

Some interesting facts stood out from the multiplicity of organisms infected in the wound. Second, the preponderance of *Bacillus perfringens*, which was found in practically every case of gas infection. When occurring alone it does not appear to be very dangerous, but when deeply seated so that drainage could not be freely established. It did not in itself produce gas or a specially foul smell in the wound. Frequently from its hemolytic properties, or action on capillary walls, there was reddish discharge, together with discoloration and bronzing of the tissue in addition to gas formation. In the photograph swelling of tissue was often seen generally; occasionally in the early stages of gas formation a dappling of small bubbles. The only deaths occurring from *Bacillus perfringens* alone was reported to be present were fractures of the pelvis and thorax.

Bacillus sporogenes was reported in culture in forty-one cases, and it was noticeable that, although there was excessive production of gas and a foul smell, the cases generally yielded to treatment unless combined with more virulent organisms. *Bacillus sporogenes* often survives when other organisms die out. The presence of *Vibrio septique* was reported in a few times, all very severe cases. In three cases Dr. Dalyell found *Bacillus Hibbertii*. Some of the more newly described organisms, such as *Bacillus histolyticus* and *Bacillus oedematiens* (fifteen cases also reported. Again and again it is noted that the association of the

coccus (fifty-nine cases) with the anaerobes increased the severity and gravity of the infection, a considerable number of cases dying with streptococcal septicemia. While the anaerobes attack the muscle, the streptococcus spreads in the fascial planes. In many cases in which the surface wound showed only aerobic infection anaerobes could be grown from the deeper tissues or sequestra. Negative bacteriological reports must be received with a certain amount of reserve on this account.

In fifteen cases there was clinical (eight) or bacteriological (seven) evidence of the presence of tetanus.

Three of these were local, with symptoms starting in one limb but becoming generalized. Symptoms occasionally developed weeks after the original injury, in one case when the wound had healed. Owing to the uniform early administration of antitetanic serum, the symptoms were masked and their very vague character made the diagnosis extremely difficult. This is peculiarly unfortunate, as in such cases an early diagnosis is followed by good results if massive doses of serum are administered intrathecally, or, failing this, subcutaneously.

The most characteristic feature about these obscure cases of delayed, latent, or masked tetanus is the peculiar facies. They have an anxious, worried look, which appears usually a little before or coincidentally with the pain in the affected limb. They do not sleep well, and careful examination may discover muscular rigidity. The administration of serum by means of lumbar puncture has been infinitely more successful than any other method of treatment.

Cases of gas gangrene and gas infection group themselves into several different classes:

The classic form associated with much gas production and little edema.

The toxic, edematous form, where edema is the most striking feature, though gas may be present.

A mixed form, associated with both gas production and edema.

Local gas abscess.

Superficial and deep-seated gas phlegmon.

Chronic and latent infection.

Septicemia; pyemia.

In the classic, well-known form there is a darkish-red discharge from the wound, a putrefactive odor, great swelling of the limb, crepitation, and the formation of hemorrhagic blebs with bronzing and discoloration of the skin. Nearer the trunk the superficial veins are distended, and a yellowish edema surrounds them. With the onset of septicemia, as the case progresses to a fatal conclusion, there is often a lemon-yellow coloration of the skin, an increase in the pulse-rate, sweating, coldness of the extremities, subnormal temperature, hemorrhagic vomiting, and dyspnea. The patient talks naturally, may eat well, and is generally conscious almost to the end.

Anaerobic organisms may remain latent many months round a piece of shell or capote; hence such cases can in no sense be regarded as clean operations, for there is every probability that if treated as such, acute sepsis will supervene. At any time they may light up and cause abscesses, pyemia, or septicemia. If drained carefully they usually do well, but an inflammatory exacerbation must be expected. This makes brain and joint explorations for latent projectiles peculiarly dangerous. In bone, particularly, do the organisms lurk, hence the necessity for drainage in reamputations, even when a careful bacteriological examination of the surface wound gives a negative report. Often the anaerobic gas organism dies off but the streptococcus remains, while latent cases of tetanus are by no means uncommon.

In the great majority of cases an anaerobic infection of the blood is fatal, and occurs as a terminal phase; the temperature falls, the pulse-rate rises. A blood-culture was made in forty-nine cases, and positive results were obtained in twenty. Of these thirteen were gas-forming organisms and seven pyogenic, six streptococcus and one

pyocyaneus, but double or triple infections were occasionally present.

In septicemic cases when the streptococcus localizes itself with the formation of a fixation abscess (as for instance at the site of a subcutaneous saline injection), the process seems to be beneficial, and to increase the resisting power of the patient to the infection. The temperature usually drops after the incision of the abscess.

On admission steps are taken to make the patients as warm and comfortable as possible with the minimum of fatigue. They are usually worn out and need sleep. After being cleansed the wound is dressed, and a bacteriological swab is taken. The patient, if the case is urgent, is then passed to the *x*-ray room and the necessary photographs or localizations are done. If there is no urgency he is allowed to sleep until the morning. (The majority of the cases arrive in the evening or during the night.) If requiring immediate treatment the patient is taken to the theater from the adjoining *x*-ray room and operated upon at once. If there is so much collapse as to negative operation, subcutaneous or rectal salines are given, with suitable stimulants, and the patient is left to sleep for a few hours before any operative measures are undertaken.

A rough bacteriological diagnosis from a smear from the wound, as to the presence of many Gram-positive bacilli and streptococci, accompanies the patient to the theater with the *x*-ray plates. If the wound is recent and superficial, it is excised entirely and sewn up, but few cases are received sufficiently early to be amenable to this form of treatment. Usually the wounds are fully opened up by cutting away bruised and infected tissue so as to make the wound conical, and foreign bodies, including portions of clothing, are removed. In addition, in the case of a perforating wound, a piece of gauze, soaked in iodine, is drawn through the wound to cleanse the surface mechanically. Damaged skin and gangrenous tissue in the track of the projectile are cut away, large drainage tubes containing a wick of gauze soaked in salt and carbolic

acid are inserted, and a special made to establish through drainage counter incisions. The opened-up is also packed with sterile gauze, moist with a mixture of 5 per cent carbolic acid, and 2½ per cent carbolic acid, and wool applied under the limb to the copious serous discharge. Various bandages are used, so that there is no tension, and the limb or wound can be

In the first few months of 1914 wounds were dressed with 5 per cent iodine alone, no antiseptic being used. This was not found to be entirely satisfactory. If pyogenic bacteria flourished, especially *Bacillus pyocyaneus*, and it was not until the addition of a small percentage of carbolic acid obviated these difficulties. For eighteen months has so far been superior to all other dressings, and Carrel's various solutions and eusol have also been given a trial. It has been used successfully in many hundreds of cases and cleanses very dirty wounds in a few days. It does not, however, prevent streptococcal infection, which is much more difficult to treat, and a form of iodine vaccine therapy was tried on a number of Arab patients in October. After preliminary surgical treatment of the wounds they were packed with iodine gauze soaked in a weak solution of Iodine, 1 dr.; iodide of potassium, 10 gr. in aqua, 25 oz. This dressing was changed daily. Whether the Arabs are particularly resistant to infection, or whether the climate was the cause, one cannot say. A considerable number of very badly infected cases recovered, and there was no tendency to the development of streptococcal septicemia. Only one case of gas gangrene died, and the rest made surprising recoveries. It is possible that this treatment of the products of dead microorganisms in the deeper tissues of the wound surface has an influence in increasing the resistance of the body.

Free drainage is obtained by the removal of loose fragments of bone. If there is a linear fracture of the humerus with a bad infection, it has

sionally been found necessary to trephine or to remove a portion of the compact bone to provide free drainage. Often these cases with severe comminution make excellent recoveries if the infected bone is removed, the wound excised, and free incisions made down to the muscular sheaths to relieve tension. The immobilization of fractures in gas infections is often a difficulty. It is important to avoid the least pressure and tight bandages. No plaster of Paris is used. Fractures of the forearm are treated by the long, wooden, back splint suitably padded, the forearm being put up in full supination. The dressing is so arranged that the case can be watched, wool and padding being placed under the limb to absorb discharge. Most fractures of the arm are treated by Thomas's humerus splints, made with specially large rings to avoid pressure, abducted to a right angle. The case can then be dressed with a minimum of movement if the supporting flannels or zinc sheeting are well arranged. Fractures of the femur are also treated if possible with extra large rings. Hodgen's splints have also been used for fractures of the neck of the femur, and for cases of excision of the hip, as suitable abduction frames were delayed in transit. Wallace-Maybury splints have been found useful. For chronic bone sinuses Morison's paste of iodoform and bismuth has been used with astonishingly good results. The cases have healed more rapidly than under any other form of treatment.

Gas infections of the shoulder have been treated in some cases by excision of the head of the humerus; occasionally drainage with fixation has been sufficient, the arm being abducted to get good range of movement should ankylosis take place. Injuries of the elbow-joint have been treated by complete or partial excision, removal of foreign bodies, and very free drainage. In a certain number of cases a considerable amount of movement has been recovered. In some the elbow has been fixed on a Jones aluminum elbow splint with connecting half loop and suspended from a Balkan splint. The patient can then move in bed

freely, and there is less tendency to edema. Wrist-joints have been treated by partial excision, with fixation of the wrist in a position of dorsiflexion on a Jones splint. Gas infection of the hip-joint has proved a fatal complication. Recovery took place in one instance only, where a resection was done with very free incisions. In another case it was done after conservative treatment had been adopted, and was too late to avert the rapid spread of gas gangrene. Early resection appears to give the best results, with very free posterior drainage. Infections of the knee-joint have been treated by lateral patellar incisions, and removal of foreign bodies and loose pieces of bone. The joint is washed out and drained for a few days down to, but not into, the joint. The limb is placed on a Thomas splint, with slight flexion of the knee-joint. In many cases good movement has been obtained.

When gas gangrene has supervened in the whole limb, amputation is a necessity. Except in one or two cases, in which injury to the vessels was probably the primary cause of the gangrene, and the gas infection secondary, a circular amputation was performed. No attempt was made to cut flaps through infected tissues. The skin is slightly retracted upward as the muscles are incised. In operating, a tourniquet is applied for the shortest possible time, and, to save time, is usually held and not fastened. Lateral incisions are made almost invariably, so that there is no intramuscular tension in the stump, and no tendency in streptococcal cases for pus to track upward. Amputation through infected tissues enables one to be more conservative, as in a case in which three gangrenous fingers were removed and their metacarpals left a useful thumb and little finger. Where the gangrene is localized to a group of muscles with or without bone injury, the muscular mass is excised, and the wound either dressed with salt and carbolic acid, or 1-in-1000 iodine solution. In such cases in the calf, arm, and forearm, some good results have been obtained. In wounds of the deepest parts of the thigh the results have

been less successful. The nearer the trunk, the more dangerous is the infection, and massive gangrene involving the buttocks and pectoral regions has frequently been fatal. It cannot be too clearly realized that conservative treatment can only be

adopted when it is possible to keep the patient under the closest observation. The process spreads with the most rapidity, and what at night appears as a simple localized flesh wound, in the morning may have become a general infection.

REPORTS ON THERAPEUTIC PROGRESS.

DEVELOPMENT IN THE PARAFFIN TREATMENT OF BURNS AND OPEN WOUNDS.

In the *Journal of the American Medical Association* of June 16, 1917, SOLLMANN says he is of the opinion that paraffins intended for the treatment of burns, etc., should comply with certain specifications, as follows:

Paraffin for use on burns, etc., should be solid, but more ductile and pliable than the official paraffin, and have a rather lower melting point. When intended especially for this purpose, it should be liquid at or below 50° C.; a thin film, when prepared and tested by the methods described in the paper of Dr. Leech, should be pliable at 28° C., and ductile at 31° C.

Sollmann would recommend that in future only paraffins complying with these specifications be used in the treatment of burns. A number of these are enumerated in Leech's paper, and apparently there is no difficulty in refineries producing other brands should they be desired. He believes that these should have the preference over the more complicated and rather inferior mixtures, whether these are proprietary preparations or published formulas, unless a definite advantage can be shown for the latter. As Sollmann has previously said, all the experience he has gathered goes against any such advantages, and he considers experimentation along that line as entirely unpromising. For cosmetic purposes, it may be advantageous to give a flesh tint to the paraffin, by the addition of a trace of scarlet red or sudan.

A number of the published formulas contain added antiseptics, such as resorcin,

betanaphthol, epithelial stimulants like sudan red, and aromatic oils like eucalyptol. The last is added confessedly as a perfume, and doubtless performs that purpose to some degree. The other antiseptics and stimulants—must be absolutely useless. Solid paraffin is used so early as a hermetic seal for chemical apparatus has been found perfectly successful for that purpose, and it does not lose its efficiency when the substance is in contact with it. In other words, the solid paraffin encloses the added antiseptic, etc., tightly and nearly as hermetically as if it were enclosed in a rubber bag, and an infinitesimally thin layer at the surface can diffuse into the wound.

Sollmann has shown this by adding resorcin or phenol to melted paraffin, pouring this in films of about 2 mm. thickness. The films were then immersed in water.

With resorcin, 0.2 per cent, in paraffin (0.2 per cent in paraffin, 2 parts paraffin, 1 part petrolatum, 1 part): After five days the water contained no trace of resorcin.

With 1-per-cent phenol (carbolic acid) in paraffin: In two and a half hours there was a very faint trace, which disappeared in five days. The wax when in contact with water showed an abundance of phenol.

Perhaps the greatest difficulty in the use of paraffin treatment is in the application of the first coat of the melted paraffin. This is apt to be painful if the paraffin is at all overheated—and this is often the case to avoid in practice. The use of a spray with melted paraffin is apt to be somewhat painful, and spraying apparatus for paraffin are not very satisfactory.

Sollmann has found that these disadvantages can be avoided by applying for the first coat liquid petrolatum in place of melted paraffin.

Otherwise the application is quite as usual: The cotton film is laid on the liquid petrolatum; then the melted paraffin is painted over the cotton, etc.

Clinically, this method is highly satisfactory. The liquid petrolatum is entirely painless, and protects the wound against excessive heat from the melted paraffin. The liquid petrolatum could be easily applied with an ordinary oil atomizer. However, this is not at all necessary, a thin layer being easily applied with a cotton swab. Dr. Beiter expresses himself as especially enthusiastic over this modification.

The use of liquid petrolatum for the first coat has the further advantage that it promises the effective application of anesthetics, antiseptics, or stimulants to the wound. These would simply be dissolved in the liquid petrolatum (or if insoluble in this, in olive oil). Sollmann has not yet given this method a clinical trial, but has worked out a series of solutions which are very promising. These will be enumerated in his next paper, so that they may be tried more extensively, and in this way any improvement in the treatment of burns may be hastened. It is scarcely necessary to call attention to the fact that under the present circumstances prompt improvements in these directions would be especially desirable.

Almost all surgeons who have had occasion to employ the paraffin treatment express themselves with various degrees of enthusiasm as to its advantages over the older methods of treatment. However, no exact comparisons have been published, so that it is difficult to say how much, if any, of the present enthusiasm is due to novelty. It would be desirable that actual comparisons be made between these methods, by those who have the opportunity and sufficient interest. Such experiments are already being started by several workers; but their value is likely to be proportional

to the number of workers engaged; again, especially because early results are particularly valuable.

He would suggest either plain paraffin or the liquid-solid paraffin sequence as a standard of comparison. This would be applied, together with the methods to be compared, to adjacent or centralateral areas. If applied to adjacent areas, the wound should be divided by imaginary lines into zones about two inches wide (oriented by marking the skin outside of the wound). It is important that the methods applied to the same patient should not be so numerous as to interfere with the practicality of the application. If it is at all possible, photographs should be taken.

Line 1: Local Anesthetics.—This appears one of the most promising improvements. Sollmann would suggest that the following be tried out, generally dissolved in liquid petrolatum, and applied by the liquid-solid sequence:

Chloretone, from 1:200 to 1:1000 (soluble in about 200 parts of liquid petrolatum).

Orthoform-New, a 1-per-cent suspension made by dissolving the orthoform in a little alcohol and shaking with olive oil. The orthoform is but little soluble in either liquid petrolatum or olive oil.

Camphor, from 1:100 to 1:20 (it is completely soluble in 20 parts of liquid petrolatum; incompletely in 10 parts).

Menthol, 1:10 (completely soluble).

Line 2: Antiseptics and Epithelial Agents.—These may have a field, especially in the later stages, or with slowly healing ulcers. Sollmann would suggest the following:

Eucalyptus oil, 2 per cent (completely soluble).

Resorcin, 1 per cent in olive oil (nearly insoluble in liquid petrolatum).

Betanaphthol, 1:400, dissolved in a little alcohol and shaken with liquid petrolatum. (It is nearly insoluble in liquid petrolatum).

Gentian violet, 1:5000 suspension, dissolved in a little alcohol and shaken with liquid petrolatum (it is nearly insoluble in liquid petrolatum).

Scarlet red, 0.5-per-cent suspension in liquid petrolatum (only slightly soluble).

In the same issue of the *Journal of the American Medical Association* BEITER states that owing to his inability to obtain "ambrine," various paraffin compounds were used by him—formulas containing eucalyptus, resorcin, betanaphthol, resin, cera flava, olive oil, and scarlet red, in ordinary paraffin. Beiter's series of cases represents over 4000 dressings on every conceivable burn, and many lacerated wounds.

Prior to the employment of the wax treatment of burns he had employed the usual methods—various ointments, various aqueous solutions, the bath treatment, exposure to the air, and picric acid.

His technique in the use of waxes was as follows: All burns were carefully cleaned at the emergency hospital by well-trained men, any blebs were opened, and all the skin that could be taken off with ease was removed. The burned area was dried either by exposure to air or by gently wiping the surface with cotton pledgets dipped in ether. Over the involved area a thin film of the wax was painted. (The wax is kept constantly in a water-bath, so that it is at all times ready for instant use.) Over the wax film a thin layer of cotton or a split piece of sheet-wadding was placed and a second film of wax was painted, sealing it to the skin at the edges of the cotton dressing. Over this a heavier cotton dressing was applied, and then the bandage. Beiter found that if the injured surface was wet or damp the first paraffin film would not adhere.

He began with the various paraffin mixtures with antiseptics; but he failed to see any differences, except some disagreeable features with the resin mixtures. For example, the undissolved resin sank to the bottom of the warming receptacle and injured the brush with which the wax was applied, making the application to the injured surface painful. He therefore discarded all drugs in his wax and used the commercial "parowax," applied as above. This was sometimes tinted pink with scarlet red simply for cosmetic reasons.

The question of melting point is first an important one, because to get a hot solution to a large area of nerve endings usually brought about a violent and energetic reaction, and to wait until the wax cooled to the extent that it had formed over it meant that it would be below the liquid state before it could be applied. However, the water-bath or household double boiler holds the point very well.

A suggestion made to Beiter by Torald Sollmann has eliminated the importance of melting-point temperature entirely and greatly simplified the technique as well as adding to the comfort of the patient at the time of the dressing. There is no way changing the results. His suggestion was that the wound be painted with liquid petrolatum, and further treatment proceeded as with the wax. In this method a layer of liquid petrolatum and cotton or sheet-wadding are placed over the injured area before the warm wax is painted on the dressing. This method has been followed in all of Beiter's cases and is greatly appreciated by the patients, who are the court of last resort. It is essential that the dressing adhere at least to the skin about the edges of the dressing; otherwise the secretions will be poured out over the intact skin, excoriate it, soiling the dressings, and making a disagreeable odor.

Beiter reaches these conclusions:

1. It is an inexpensive dressing; a pound of wax and a pint of liquid petrolatum together costing about 65 cents, will dress many burns. It replaces the gauze dressing at this time is quite expensive.
2. It is a comfortable dressing; it is firm and smooth, and the gauze surface does not grow through it. It is the gauze. The paraffin is hard enough to make the dressing somewhat rigid, but it acts as a splint.
3. It is a cleaner dressing than the gauze. Beiter has used it because the wound charge is not permitted to soak through the impermeable wax covering, so that the linen that comes in contact with

patient. As the secretions are sealed up, there is no noticeable odor about the patient, which was a disagreeable factor with former methods of treating these injuries.

4. Superficial burns heal more readily under the wax treatment than with any other method with which Beiter is familiar. This is due to but one fact: under former methods of application of solutions and oily substances, no matter what their kind, the granulations penetrated the meshes of the dressing in contact with the wound, and on removal at redressings these granulations were destroyed, regardless of the care with which the dressing was done or the method employed in the removal of the dressings in contact with the wound. The paraffin film method does not adhere to the injured area, and therefore does not injure the granulation tissue and the epithelium that is attempting to cover in the denuded area. Early in the course of the burn, if it is an extensive one, the entire sealed surface of the dressing will be filled with fluid, so that it is merely lifted off. Later, as the wound heals, the secretion diminishes, and the granulations begin to grow, the epithelial islands appear as white points at the site of hair follicles, and from these islands epithelization takes place rapidly because the epithelium is not injured in the dressings and redressings.

5. Deep burns do not repair any more rapidly under this method than any other method. There is no difference in the scars of burns treated by the wax method and any other method. If the true skin is destroyed, the end-result is scar tissue or an ulcer. If scar tissue replaces the destroyed tissue, it performs as does scar tissue that develops under any and all forms of treatment, and as scar tissue has performed since the beginning of time. He has tried treating two sides of a body burned to about the same degree with the wax method, the solution method, and various other methods, and has been unable to detect any difference in the end-result, as to scar.

6. The wax method is much more com-

fortable at dressing time than any other with which Beiter is familiar, for the purely mechanical reason that the granulations do not grow through it, and it is lifted off painlessly. To those who have to do with burned men this means a great deal. The pain endured by the patient as the dressings were removed under previous methods of treating burns left an unpleasant impression to carry with one on the day's rounds.

7. Beiter thinks there are fewer furuncles on his burned patients since the wax has been used, but nephritis is quite as common.

WATER PURIFICATION IN THE FIELD.

The *British Medical Journal* of May 26, 1917, points out that the water problem of an army at war differs in a hundred ways from the same problem in civilian life. To the military sanitarian in the field every water is necessarily suspect, and his task has always been to devise a simple, rapid, handy method for making the foulest water safe and drinkable for troops on active service, whether in camp, on the march, in trenches, or in the thick of fighting. For years past the Army Medical Department and its scientific experts have labored at this problem; to their credit it must be said that they grasped the bitter lessons of former campaigns, and applied them to the full in this war, with the happy results which all can see. The dangers of water-borne disease and the need for care in the matter of drinking water have been impressed upon officers and men of every branch of the army, and organized bodies of men, trained in their duties by medical officers, have vigilantly safeguarded the water-supply at every point. As knowledge has been gained during the war from laboratory investigations and from practical experience, this has been used to perfect the technique of water purification. Old notions have undergone revision. Thus the test of practice under active service conditions has shown that certain methods, such as boiling and filtration, are difficult

to use or unsatisfactory in their results. Chemical disinfection, on the other hand, which was formerly looked upon with less favor for routine purposes, has proved its value and practicability.

Chemicals have long been used, of course, for three distinct purposes in water purification—to clarify, to soften, and to disinfect. The last-named alone need detain us. It used to be said in the text-books of military hygiene that while disinfection by chemicals was theoretically promising, the difficulties of applying it to the conditions of life in the field were very great. Nevertheless, continuous efforts were made to develop the idea, and the chemical disinfection of drinking-water has steadily gained in favor since the early months of the war. Of the chemical agents which have been tried at one time or another, chlorine and its compounds are by far the most important. Other members of the halogen series have been tried, but chlorine in the liquid state, or in the form of bleaching powder ("chloride of lime," calcium chloro-hypochlorite, CaCl.OCl), or of sodium hypochlorite, seemed to be the only one suitable for sterilizing water on a large scale. More than twenty years ago calcium hypochlorite was tried in a crude way in the Austrian army, but no attempt was made to overcome the disagreeable taste and smell of the water thus roughly chlorinated. The results did not encourage our own military hygienists to adopt the method at that time, although they recognized the strong germicidal effect of chlorine upon drinking-water, and its advantages in this respect over permanganate, acid sodium sulphate, and even iodine.

Twelve years ago, however, the sterilization of water by simple chemicals in the shape of hypochlorites was tried on a large scale in civilian life during a water-borne outbreak of enteric fever at Lincoln, with successful results. Between 1905 and 1911, as we learn from a valuable recent monograph, Houston and McGowan pursued the method further and treated the Lincoln water-supply with an alkaline solution of sodium hypochlorite containing 10

to 15 per cent of available chlorine, since 1908 Johnson disinfected the famous Bubbly Creek water, at Chicago, with bleaching powder, the use of hypochlorites for sterilization has spread throughout the United States. In England progress on the part of the civil water authorities along this line has been slow, but the example set by the Metropolitan Water Board last year, and the remarkable experiments with chlorine in the army, are bound to have far-reaching effects on civilian methods.

In bleaching powder, as has been said, nature and art have placed at our disposal a simple and invaluable method of sterilizing water on active service; its cost and weight are very small in proportion to the amount of water which it treats, and the use of a solid reagent has obvious advantages. It is also, what is of great add, a comparatively cheap method. Commercial chloride of lime is even more expensive than the corresponding hypochlorite salt. One pound of bleaching powder will treat 33,000 gallons of water suffices to sterilize one part per million of available chlorine. In this strength the liberated chlorine is usually depended upon to kill the germs of water-borne disease within a few hours, the test being the total destruction of bacillus coli. Effective treatment in this manner confers absolute, not merely temporary, protection, and Dr. Houston maintains that properly chlorinated water is not only quite innocuous, but can also be made quite tasteless to all but the most fastidious palates. Speaking of the future of water purification and the popular prejudice against "doctored" drinking-water, Dr. Houston makes the significant remark that "the war has taught many lessons, including the necessity of subordinating sentimentality to expediency."

Early in the war Professor Sims, who has headed in the columns of the *British Medical Journal* reported that by experimenting along the lines indicated above, which were laid down in England and then adopted in America on a large scale, he has himself treated even a highly polluted

after ordinary filtration could be made perfectly safe and tasteless for drinking purposes by chlorination with bleaching powder, and that the amount of chlorine needed in any particular instance could be determined by means of the simple iodine and starch test which he described. Further practical investigations by Colonel Horrocks and others indicated a way of treating water with bleaching powder in the field by the Army Medical Department. The fruits of this work have been incorporated in the sanitary organization for the British troops in the various theaters of the war with the best results. Chlorination, preceded where possible by rough filtration, has thus come to be the normal method of water sterilization in the front area, and, indeed, on active service generally. The method has been standardized for the use of the water personnel of the army, and complaints on the score of unpalatability are, we believe, seldom heard.

So far we have spoken mainly of the disinfection of comparatively large volumes of water such as can be stored in tanks and water-carts or run in pipes from makeshift reservoirs. The purification of drinking-water for scattered soldiers or small isolated bodies of troops has presented special difficulties, due partly to the deliquescence of chloride of lime and kindred chemicals in pellet form, and partly to the limitations of human nature. In another column of this issue of the *British Medical Journal*, Dr. Dakin and Major Dunham, of the United States Medical Service, describe a new substance which they have devised for the preparation of stable tablets for disinfecting polluted water by the individual soldier. Their paper illustrates the happy results which may follow investigations into a practical problem when they are carried out along strictly scientific lines, and, incidentally, the power the modern scientific chemist has over his materials, so that he can set to work deliberately to produce a substance fulfilling certain conditions as to activities and solubility which he desires to obtain. The substance which Dakin and Dunham, after several experiments,

have selected as fulfilling both the biological and practical requirements of the problem is parasulphondichloraminobenzoic acid, to which, when made up into tablets, they propose to apply the convenient working name of "halazone." The substance can be easily prepared from accessible substances at small cost, and it is estimated that with it a hundred gallons of water—a quantity which would meet the normal demands of two hundred men for drinking-water in a day—can be disinfected for one penny. The result of this research marks a further step forward in the task of safeguarding the health of all soldiers at the front from water-borne disease.

THE INTRAMUSCULAR OR SUBCUTANEOUS INJECTION OF NEOSALVARSAN.

To the *British Medical Journal* of May 5, 1917, HARRISON, WHITE, and MILLS contribute a report which in its conclusions is not in accord with hitherto accepted views on this subject. They advocate the intramuscular injection of 0.6-gramme neosalvarsan dissolved in 1 Cc. of a 4-per-cent solution of stovaine, and made up to 2 Cc. with creo-camph cream melting at 150° C.

This has proved the most comfortable injection up to the present. In some cases it has been accompanied by a hypodermic injection of morphine gr. 1/3. This has been sufficient to overcome the dull ache in the site of the injection, which may last for about six hours afterward.

The solution is effected by dissolving the neosalvarsan in the syringe, the creo-camph is added, and the mixture well shaken.

The injection is made about a point three fingerbreadths below the crest of the ilium, on a line joining the tuber ischii with a point on the crest of the ilium which is perpendicularly above the great trochanter when the patient is upright. The detached needle is driven into the muscle vertically to the skin.

The general reaction which follows an intramuscular injection of neosalvarsan is much less than after an intravenous, and

they have not experienced any cases of vasomotor disturbance—flushing, constriction of the throat and chest, etc.—such as sometimes follows an intravenous injection. The tonic effect is greater when the injection is intramuscular than when the remedy is administered intravenously. It will be remembered that in the early days, when salvarsan was administered intramuscularly, the tonic effect was a pronounced feature in all reports on the subject.

The authors conclude that:

1. The intramuscular or subcutaneous injection of neosalvarsan, novarsenobenzol, or novarsenobillon is superior in immediate therapeutic effect to that of the intravenous injection of salvarsan, kharsivan, arsenobenzol, or arsenobillon.

2. Spirochetes disappear from syphilitic lesions just as readily after the first intramuscular as after the first intravenous injection, and the Wassermann reaction is more quickly influenced.

3. Solution of the dose of neosalvarsan in 1 Cc. of 4-per-cent stovaine and emulsion in creo-camph cream eliminates discomfort sufficiently to make the intramuscular injection of neosalvarsan practicable for routine use.

Since the above was written the authors have given a number of injections in which the creo-camph was replaced by camphophenique, with, so far, encouraging results.

THE SALICYLIC TREATMENT OF RHEUMATISM.

To the *Lancet* of June 16, 1917, CANNON writes as follows:

Being surgeon in charge of H. M. S. *Salamander* off the north coast of Australia, Surveying Service, in 1862, he had a case of acute rheumatism, and, being a thousand miles from a drug store, he wanted to prescribe quinine, but found he was out of it and had only a bottle of salicin, then hardly used in medicine. This he administered with good results. Cannon thinks he must have been thus the discoverer of the salicylic treatment of rheumatism.

Perhaps some curious reader might lighten Cannon, as he thinks it was an instance of that great antirheumatic being used.

The late Dr. T. Maclagan stated (1876, i, 342) that the idea of treating rheumatism with salicin occurred to him in November, 1874.

ARTIFICIAL CEREBROSPINAL FLUID

In the *Journal of Laryngology, Otolaryngology, and Otology* for May, 1917, McKENZIE states that two or three years ago he experienced a small run of cases of epidemic meningitis which were treated in the usual way by drainage with considerable success. Thinking over the fatal cases, it occurred to him that for purposes of lavage of the cerebrospinal spaces and cavities an artificial cerebrospinal fluid ought to have preference over the usual normal saline, the latter is apparently a fluid foreign to the regions.

Unfortunately—or fortunately—he has not since had an opportunity of trying it. He has not since had an opportunity of trying the fluid, and as some efforts are now being made to treat epidemic meningitis by lavage, it may be well to publish the composition of the fluid McKenzie employed.

The following, then, is the formula for the fluid which was prepared for McKenzie by Dr. Wingrave:

Potassium chloride.....	3
Sodium chloride.....	1
Potassium carbonate.....	0
Glucose	2
Distilled water.....	100

This forms a stock solution, from which the fluid for use (sp. gr. 1002) is made as follows:

Stock solution.....	1
Sterile distilled water.....	9

Care must be taken in sterilizing, and in mixing the saline-glucose solution with the glucose. For that reason, in making the stock solution, the salts should be dissolved in the water and the solution should be sterilized before the glucose is added to it. McKenzie knows of no method of sterilizing glucose itself.

In any event, it is advisable to have the stock solution freshly made for each case and its dilution effected in the operating theater.

This fluid does not, of course, contain any of the internal secretions with which modern research is acquainting us, such as those of the pituitary gland, and time and experiment are needed before one can say how much pituitrin, if any, should be added to the solution.

DIARSENOL ADMINISTERED BY BRAYTON'S SIMPLIFIED METHOD OF GIVING SALVARSAN.

In *Colorado Medicine* for June, 1917, Low states, since reading Dr. F. A. Brayton's article on the simplified method of administering salvarsan, he has been using it in giving diarsenol, the Canadian product.

This method is very simple, the time expended from the beginning of sterilization until the procedure is completed being only twenty minutes.

The apparatus used consists of:

1. One 30-Cc. Luer syringe with needle.
2. One glass-stoppered 60-Cc. shaking bottle containing 25 glass beads.
3. One bottle of 15-per-cent freshly prepared solution of sodium hydroxide, with medicine dropper.
4. One 50-Cc. glass funnel.

The above described apparatus is sterilized by boiling in freshly distilled water in an eight-inch aluminum pan. The shaking bottle, containing 30 Cc. of water, is removed from the pan and the diarsenol added. It is then shaken until a clear amber solution exists. Fifteen-per-cent sodium hydroxide is then added until the precipitate which at first forms is dissolved.

The solution is now poured into the glass funnel, in the bottom of which is a pledget of sterile cotton, and filtered directly into the barrel of the syringe. Insert the plunger, attach the needle, and express any air from the syringe. Proceed as in any intravenous injection. The arm is prepared by washing with soap and water, drying with

ether, then applying 10-per-cent tincture of iodine over the area.

It is readily seen that both time and labor are saved by this method. The solution can be injected in from thirty to forty seconds, while with the gravity method it takes from ten to fifteen minutes. One can always be sure the needle has not passed through the vein by withdrawing the plunger slightly and noticing the blood mixing with solution, if the needle is in the lumen of the vein. No air can enter the vein in using this method.

In a series of twenty-five injections by this method, during the last two months, Low is convinced that the reaction is less than when using larger amounts of water. The so-called "water faults" are practically eliminated. Diarsenol gives less reaction than salvarsan; its influence on the Wassermann test is positive; its toxicity is lower; and finally, this method is an office, one-man procedure.

[We doubt if a rapid injection as advised is wise.—ED.]

CAMPHORATED VASELIN OIL—A WARNING.

The *Lancet* of June 16, 1917, says that owing to the fact that liquid vaselin is easier to sterilize than olive oil, certain French pharmacists have been tempted to utilize it in the preparation of camphorated oil. The substitution is not always devoid of consequences. Several instances were recently brought before the Paris Surgical Society of extensive and obstinate indurations which had resulted from injections of *soi-disant* camphorated oil. In every instance inquiry elicited the fact that vaselin oil had been used in the preparation. Histological examination showed the indurations to consist in the main of inflammatory tissue containing numerous polynuclear cells. Physicians should not be tempted to prescribe, or dispensing chemists to substitute, liquid vaselin oil for the more assimilable vegetable.

[Vaselin probably prevents the absorption of the camphor.—ED.]

PROLONGED FEEDING THROUGH NASAL TUBE.

MOORE in the *British Medical Journal* of May 12, 1917, reports a record case of this character:

Michael McA. was admitted to the Don-egal District Asylum, Letterkenny, on January 27, 1885, and died there on April 2, 1917, at the age of eighty-one years. For several years after his admission he had to be spoon-fed, but for the last twenty-one years and seven months he was fed three times daily through the nasal tube. He enjoyed excellent health until the last three months, when he began to fail. Moore never heard of his taking a drink of water for all these years, but during the last two days of his life he took warm milk from a fellow patient, but not from an attendant. The following was his daily diet scale:

Breakfast: One quart of milk, two eggs, 1 1/7 ounces of sugar.

Dinner: One quart of beef tea or beef fluid made with Bovril or Oxo, and one or two potatoes mashed fine enough to go through the nasal tube.

Supper: One quart of milk, one egg, and 1 1/7 ounces of sugar.

THE CONTROL OF TOXEMIA DUE TO PULMONARY CAVITATION AND PUS RETENTION BY POSTURAL TREATMENT.

In the *Southern Practitioner* for July, 1917, ROBERTSON reminds us that we are now told by a number of writers that we have the so-called mixed infection in tuberculosis, and following the latter-day trend our faith and hope is fixed upon some form of vaccine treatment for the relief of the distressing symptoms. Robertson thinks we should regard these cases as pulmonary septicemia, due to the absorption of pus organisms caused by faulty or imperfect drainage. With this conception he has been stimulated to devise some plan by which drainage could be favored, thereby ameliorating the conditions above referred to, and contributing in no small measure to the comfort and well-being of these patients.

Some years ago at the Watauga Sanitarium, Robertson instituted a systematic form of postural treatment to meet this indication, and up to the present time his results have been most gratifying.

In instructing the nurses whose duty it is to carry out this postural treatment, Robertson has explained that these pus cavities are but veritable cups containing pus and a multiplicity of toxic materials, which, if allowed to remain, would greatly prejudice the patient's welfare and materially add to the discomfort and suffering, and that by postural treatment it is his purpose to put the patient in such varying positions as will enable him to turn all the cups upside down during a given period.

The plan outlined is about as follows: In the early morning, after the patient has finished his first morning cough or respiratory toilet, and before he has had his breakfast, he is requested to lie upon the right side for twenty minutes. An hour and a half after breakfast he is requested to lie upon his left side for the same length of time. Toward the middle of the day, before having his midday meal, he is required to lie on his stomach for twenty minutes. In the afternoon he is either placed in a sitting position or allowed to be on his feet for the same length of time; and at some time before retiring for the night he is put in an inverted position, by having him lie upon the stomach, moving him crosswise of the bed, resting his head, supported by his hands, upon the floor. This routine is repeated daily, and of course presupposes that the patient sleeps upon his back, thus giving him a complete postural treatment that will favor the emptying of all pus cavities in his lungs having a satisfactory outlet.

This routine is of course modified to meet individual requirements made necessary by the physical condition of the patient, and it is necessary to use judgment here as in all other therapeutic measures. Robertson has not failed to have a prompt and almost complete disappearance of the group of septic symptoms in every case on which this method has been tried, and he believes

that if it is intelligently carried out in properly selected cases, much good can be accomplished.

Many patients suffering with moderately advanced and advanced tuberculosis will complain that they cannot lie upon the right side, or perhaps the left side, for the reason that it produces an intolerable fit of coughing. Postural treatment will, within a very short time, enable the patient to sleep in almost any position without this annoyance, as Robertson has demonstrated in many instances.

THE ACTION OF ULTRAVIOLET RADIATION IN KILLING LIVING CELLS SUCH AS BACTERIA.

BURGE in the *American Journal of Physiology* of June 1, 1917, says that exposure of living cells to ultraviolet radiation of sufficient intensity to kill the cells, does not decrease to any appreciable extent the activity of the intracellular enzymes.

Evidence is presented in this paper to show that ultraviolet radiation kills living cells by coagulating their protoplasm.

A PRELIMINARY REPORT ON THE TREATMENT OF NARCOTIC ADDICTION.

Writing in the *Medical Record* of June 9, 1917, STOKES asks: What are withdrawal symptoms, and how are they explained? It is well known that on the sharp withdrawal of drugs that depress function we have marked "counterfeit" stimulation, and so it is with narcotics. The wave of "counterfeit" stimulation sweeps from the cortex over the entire nervous system, and is strikingly evident in the preganglionic sympathetic fibers described by Cannon as going direct to the adrenals, there causing a sharp output of adrenalin, thus inducing an acute sympathicotonic state, in which the autonomous side of the vegetative nervous system, the extended vagus, is inhibited (Biedl, Falta). The clinical picture is that of profound fear so perfectly drawn by Darwin. The wide

pupil, pale, clammy skin, the heart running to exhaustion, the gaping, sneezing and other manifestations of respiratory disturbances, with the gastrointestinal tract blanched and motionless—in other words, it is deep vagus inhibition that we see, profoundly overshadowed by the sympathetic. An adequate dose of narcotic holds back adrenalin, tranquillizes the condition, and the relief is immediate and complete.

The fear complex may also be classed as "counterfeit," for there is no adequate emotional stimulus in evidence to account for the condition. The writer long ago pointed out the pathology of the withdrawal symptoms in narcotic addiction, and has since endeavored to unearth remedies that would stimulate the extended vagus, the autonomous nervous system, firm in the belief that when this was accomplished and an approach to the normal balance between the sympathetic and autonomous systems could be established and maintained, the patient would be free from symptoms of narcotic withdrawal. This has been amply demonstrated in a series of 130 cases made up of opium, morphine, heroin, and codeine users.

After a thorough trial, the ductless gland products were discarded, as too slow in action to combat so sharply acute a condition, even where they were reputed to be pronounced autonomic stimulants. It was found that in pilocarpine and eserine we have two remedies that meet the indications perfectly, in doses far below the minimum medicinal doses in common use; for example, the largest single dose of pilocarpine hydrochloride that has been given by Stokes was 1/10 of a grain, with the average dose somewhere between 1/15 and 1/20, repeated every two or three hours for the first forty-eight hours, when the medication is discontinued as a rule.

Soon after the beginning of treatment the face becomes flushed, the pupils narrowed, ptialism and sweating are induced, the heart action is slowed down, gastrointestinal peristalsis is established, the gall-bladder is emptied, the intestinal glands functionate actively, the bowels move, and the patient is hungry. Refreshing sleep

often follows the first dose—indeed, patients often have to be aroused for their medication; they are perfectly tranquillized. If the saliva is swallowed they are apt to be nauseated. While cathartics are sometimes given, they are not always necessary, and should under no circumstances contain any of the hyoscine-atropine group, which is absolutely contraindicated in this condition. If the pulse is slowed down unduly, it is better to cut down the amounts of pilocarpine and eserine, rather than to lengthen the interval beyond three hours, or stop the medication altogether, for if this is done, naturally the patients will show withdrawal symptoms. It is better then to give an eighth of a grain or even a quarter of a grain of morphine, and a half-hour later begin the treatment anew, giving the two remedies in reduced doses. These small doses of morphine merely hold back adrenalin, in addicts, and cannot be regarded as narcotic. All food, in fact everything by mouth, is withheld for some hours, in order to avert antiperistalsis.

There have been no untoward symptoms in any case in this series, which has included valvular and myocardial disease of the heart. One patient, a physician, seventy-six years of age, forty years an addict, whose wife reported that he had been taking 130 grains of morphine a day, was taken off abruptly without incident. In this case, however, some days later, the patient had outbursts of rage without provocation, and was irritable and impatient. He was treated under crude and unfavorable circumstances, which materially interfered with the adjustment of his nervous system to the problems of reality that had passed him by during his long period of narcotism. While his general physical condition improved, on account of his surroundings and his advanced age it was deemed wise to give him the amount of morphine that would tranquillize him, which was found to be three grains. He can be taken off under more favorable circumstances without doubt. Other elderly patients treated privately have done well.

Psychic shock or unfavorable emotional

stimuli of one sort or another are liable to disturb the nice balance in the vegetative nervous system, and throw the patient into withdrawal symptoms—in fact, Stokes has many times deliberately brought this about.

As the patients are apt to be awake the second night, it is customary to give morphine in divided doses, beginning the second noon of the second day of treatment. Craving ceases after the treatment is begun in this way, and the patients cannot tell when the narcotics are discontinued. The condition reminds one of that seen in the case of pneumonia; it is one of complete tranquility. Unless the physician has a clear understanding of the pathology of the condition as herein outlined, and the indications for the variations in treatment, he is likely to be disappointed in his results.

It is interesting to observe the types of minds uncovered in this way; in some cases the underlying factors are the cause of the addiction, and the treatment always underlying causal factors, strongly in evidence. The common type of mind is that of an older child, neither hardened nor matured to contact with reality. The physical condition in these cases is soon corrected, and rarely see complicating organic lesions as a consequence. The readjustments of the nervous system take a longer time. It seemed to Stokes well worth while to explain as far as possible just what is to take place, so that patients can coöperate. They will understand that the readjustments of the psychic level are often tedious and sometimes disappointing. Frank problems in psychiatry must be solved before there is any hope for permanency of recovery. Mental and physical fatigue are to be avoided. Strychnine, tea, and coffee should not be given. It may be that in the Abderhalden reaction we shall find a good indication to guide us in the niceties of after-care.

By robbing the condition of much of its dread of suffering this plan of treatment appeals to addicts, and they soon find that convalescence begins at once instead of being dragged out unduly through gradual reduction, and other methods that

plant one poison with another. Sufficient time has not elapsed to make any definite predictions as to permanency of freedom from addiction, still the outlook is most promising, particularly if the patients will seek new surroundings and associates, when they resume their former occupations. In the majority of cases the relapses are due to their returning to their old pals and old haunts, where they are soon beset by the insistent drug sellers.

Heroin should be abolished. Stokes found that this drug was used in over ninety per cent of the cases seen by him. Heroin can be completely done away with without adding to the suffering of the sick or harming them; in fact, the United States Public Health Service, in view of the drug evil, has discarded heroin completely, and will take steps to have legislative measures enacted that will further meet this distressing situation.

While the pathology of alcoholism differs from that of narcotic addiction, there are emotional manifestations in this disease that can be tranquillized by playing up the autonomous nervous system. Stokes has seemed to avert delirium tremens in some cases in this way.

PHYSIOLOGY OF THE NEW-BORN INFANT.

In the *American Journal of Diseases of Children* for June, 1917, TALBOT reaches these conclusions:

1. The respiratory quotient of new-born infants indicates that the supply of glycogen in the body is quickly used up, and that the energy is obtained in large part from the body fat until the breast milk "comes in."

2. The energy requirements of new-born infants are smaller per unit of body weight than in older infants.

3. The total calories of the basal metabolism of a new-born infant may be calculated from the following formula:

Total calories = length \times 12.65 \times body surface.

4. Chilling from exposure or a water-bath depresses the metabolism and with it

all the body functions. A new-born infant should not be bathed in water, and great care should be taken that it is not chilled. Warm oil should be used to clean the body.

5. Since a new-born infant is starved until the breast milk "comes in," weak or premature infants should be fed, shortly after birth, preferably with the milk of another woman; but when this is lacking, a 5-per-cent solution of some sugar such as lactose should be given as a temporary expedient.

A COMPARISON OF THE EFFECTS OF BREAKFAST, OF NO BREAKFAST, AND OF CAFFEINE ON WORK IN AN ATHLETE AND A NON-ATHLETE.

In the *American Journal of Physiology* of June 1, 1917, HYDE, ROOT, and CURL state that a weak dose of 1.42 grains of caffeine, without work or breakfast, gradually increased the pulse-rate during the first hour, but in the non-athlete as a rule only after a slight initial fall. In both subjects the pulse returned to the normal rate within three hours. With the larger dose, 2.24 grains, under the same conditions, the increase in pulse appeared more promptly, but in thirty minutes was depressed below normal in the non-athlete, and accelerated above the normal rate in the athlete. The blood-pressure rose above the normal level in one hour, and frequently had not returned to the level in three hours after taking either of the doses of caffeine.

The effects of caffeine taken at different intervals before work varied with the dose and the individual. In the athlete the maximum influence of a dose of 1.42 grains was manifested in three-quarters of an hour, and in the non-athlete three hours after the dose was taken. The athlete did but little more work forty-five minutes after than he did twenty minutes after taking the drug. But the non-athlete did two and a half times as much work three hours after as he did twenty minutes after taking the dose.

Power and endurance for work, and car-

diac activity and increase in blood-pressure, do not keep pace with increase of dosage. The maximum power for work in both subjects was attained with the dose of 2.24 grains of caffeine. With this dose both subjects did two and a half times as much work as they were able to do one hour after eating breakfast. In the athlete with this optimum or with the weaker dose of caffeine, the blood-pressure was no greater than after the maximum work done either with or without breakfast, and the heart-rate was only slightly more accelerated. In the non-athlete the pulse-rate was almost three times as much, but the blood-pressure was no higher than it was after the maximum work following the meal. A strong dose of 3.58 grains depressed the muscular power for work in both men, but very markedly so as well the blood-pressure and pulse-rate in the non-athlete. In the athlete the blood-pressure was no different, but the heart-rate was less after the work following the weaker dose. When the dose was taken in proportion to the body weight, *e.g.*, 0.2 grain of caffeine per 9.3 kilos body weight, or a stronger dose of 0.2 grain per 5.9 kilos body weight, the results presented another view-point to those obtained when the dose was taken irrespective of body weight. The facts showed that of these two doses thirty minutes before beginning work, the weaker dose and not the stronger stimulated the working power in the athlete most. But in the non-athlete the reverse was the case. With the stronger dose the athlete did one-fourth less and the non-athlete one-fourth more work than with the weaker dose. At the same time the pulse-rate was enormously increased in the non-athlete and less so in the athlete, who did double the work done by the non-athlete. On the other hand, the blood-pressure fell slightly in the non-athlete, and fell also or remained unaltered in the athlete, after work and after taking the stronger dose. Therefore, for each subject there was a definite optimum dose which, when increased, proved depressing for muscular work, blood-pressure, and pulse-rate.

One hour's rest did not remove the sense

of fatigue produced by the ergometer but when caffeine was taken the fatigue of the previous hour's work was inhibited. Both subjects did more work than they did even twenty-four hours after taking caffeine, than they did before taking the caffeine. With the same dose of caffeine and without eating breakfast, the power for muscular work in the athlete was greater at 4.20 P.M. and in the non-athlete at 8.20 P.M. than at 8.20 A.M. That is, the athlete did his best work eight hours after taking the caffeine and four hours after lunch, and the non-athlete did his best work ten hours after taking the dose, and two hours after dinner. At these respective periods the pulse-rate and blood-pressure increased greatly in the non-athlete, and the pulse-rate but not the pressure in the athlete. The after-effect of the larger dose was a heightened condition of irritability that persisted many hours after the drug was taken. The power and endurance for work were increased, and the cardiac activity greatly affected, but the blood-pressure less so with the stronger dose.

EFFECT OF ALCOHOL ON THE RESPIRATION AND THE GASEOUS METABOLISM IN MAN.

In the *Journal of Pharmacology and Experimental Therapeutics* for May, 1907, HIGGINS in a paper on this subject states that his experiments were made on subjects reclining and breakfastless, as to the dose of 30 Cc. and 45 Cc. of ethyl alcohol was usually diluted but not as alcoholic beverages. The effect on the respiration and the gaseous metabolism.

Alcohol sometimes acted to increase the sensitivity of the respiratory center, as shown by a drop in the alveolar carbon dioxide tension; sometimes alcohol acted without action on the respiratory center.

Alcohol did not have any bronchoconstrictor action and seldom any bronchodilator action, as shown from determination of the dead space of breathing.

The respiration rate was not appreciably affected by alcohol, nor was the ty

respiration changed, unless there was restlessness.

The heat production, as indicated by the oxygen consumption, was ordinarily unchanged by alcohol; in about one-fifth of the experiments there was a rise in heat production of from 5 to 7 per cent.

There are indications in about 45 per cent of Higgins's experiments of a relative acceleration in the pulse-rate after taking alcohol as compared to taking the control solution. In 55 per cent of the experiments this relative acceleration did not occur.

Study of respiratory quotients obtained indicate (1) that 45 Cc. of alcohol is not burned at a faster rate than 30 Cc.; (2) that probably 20 to 40 per cent of the total metabolism is due to alcohol; and (3) that if the rate of combustion continues at the same rate as in the first two or three hours, it requires eight hours before all of the 30-Cc. alcohol and twelve hours before all of the 45-Cc. alcohol is completely burned.

Alcohol diminished the volume of air breathed per minute in a majority of the cases; this was due to diminished carbon-dioxide production.

DRUG USERS IN COURT.

ANDERSON in the *Boston Medical and Surgical Journal* of May 31, 1917, states that the drug habitué in court is a more or less delinquent individual, appearing frequently because of larceny, offenses against chastity, and such. If put on outside probation, two-thirds of these individuals have either to be surrendered to the court or put in non-penal institutions. Two-thirds of the cases he studied were not supporting themselves by legitimate means, suffered from physical conditions that greatly impaired their industrial efficiency and handicapped them in any fight they may have wished to wage against the enslaving effects of narcotic drugs; 81.5 per cent showed some form of mental defect, psychopathic personality, or mental impairment from drugs, which in terms of will-power meant impaired ability to resist.

In the light of the foregoing facts we can

understand why medicinal preparations alone do not cure; why short periods of treatment are so often futile.

In the light of the foregoing facts we can question the wisdom of undertaking disposition or treatment of any drug case without determining beforehand his individual ability to profit thereby.

Further, we can strongly advise against trusting a drug user to cure himself, or expecting satisfactory results from any method that does not provide for prolonged detention, careful physical and mental rehabilitation, and upon discharge, well-directed medical and social service methods of treatment.

THE DANGERS OF LUMBAR PUNCTURE.

The *New York Medical Journal* of June 9, 1917, in an editorial says it is exasperating to the enthusiastic physician on the trail of a diagnosis to have the patient himself, or his relatives, refuse to allow a lumbar puncture on the grounds of the danger involved. Perhaps the fluid has been withdrawn once and the patient suffered considerable pain at the time, or, being of a neurotic make-up, complained for days afterwards of a headache, dizziness, pains in back, etc. The temptation is great in such instances, especially where the diagnosis is obscure, and one hesitates between a hopeful and a hopeless prognosis, to tell the apprehensive relatives that this procedure is absolutely without danger. We would be going a little too far, however, in doing this. Let us look into some of the dangers which are actually existent.

First of all, there is the danger of infection. Do we see a smile? Perhaps there are some who are so confident of their technique that infections have been relegated to the limbo of the impossible, wherever that is. But of such the real surgeon is not. About a year ago an investigator who modestly styled himself a "laboratory technician" published in the *Modern Hospital* an account of some careful bacteriological studies which he had made in

operating-rooms, of supposedly perfect technique, but where infection had been occurring with alarming regularity. Platinum loop and test tube in hand, he followed the operations step by step from the time the first package of gauze was put in the sterilizer until the last dressing was put on the wound, taking cultures here, there, and everywhere. And always at some point in the routine he found a flaw. The germ, Lilliputian in its contours, Brobdingnagian in potentialities, fastened somewhere on a link in the chain, and thus the whole chain was rendered weak. So if infection can occur in the operating-rooms of surgeons who make it their constant care to prevent them, they may also occur in the practice of the family physician who, down in the bottom of his honest old heart, looks upon all the refinements of sterilization as just a little absurd. Infection then may occur in lumbar puncture, and this must be borne in mind when urging the family to consent.

Unpleasant after-effects are by no means rare, especially in the class of patients who react badly to everything of this sort. Remembering that "one of the functions of the cerebrospinal fluid is to maintain an equality in the intracerebral pressure, and any sudden alteration, such as is produced by the withdrawal of five, ten, or fifteen cubic centimeters of the fluid, is apt to disturb such equilibrium," headache, nausea, and vertigo which do not always clear up in a day can sometimes be anticipated. Sudden death has even been known to follow lumbar puncture. This is usually due, of course, to a brain tumor, and if this is suspected the greatest care should be exercised. Then, too, the patient may be suffering from general paresis, the course of which cannot be predicted with certainty even a day in advance. The withdrawal of fluid may precipitate or be coincident with convulsive seizures. These may terminate in death, and if we are then able to convince all the relatives that death was not due to the lumbar puncture, our place is in front of His Honor, addressing the twelve good men and true.

Leaving out of the question, however, actual accidents and sequelæ of spinal puncture, we must consider another class of patients, the neurotic and hysterical, in these the introduction of a needle, their imaginations represent as Gargantuan into their spinal column, about which laity have all sorts of weird ideas, is a terrible and terrifying thing. The association of ideas is injury to the bone, broken back, and either death or paralysis. It is quite possible then for individuals to develop a hysterical paralysis probably taking the form of paraplegia following this procedure. Here again it is easy to visualize the task before the physician who would persuade the patient and his relatives that the paralysis was idiopathic and not caused directly by the puncture.

Let us then not be betrayed by scientific enthusiasm into stating boldly that lumbar puncture is absolutely without danger. We should rather tell the patient and his family that it is considered an ordinary diagnostic procedure nowadays, that it is necessary to clear up certain points in his particular case in order that we may treat him more intelligently, and that, exercising such care and skill as will be given to it, the danger is very, very slight.

ONE ROAD TO THE CONTROL OF HEART DISEASE.

In the *Journal of the American Medical Association* of June 2, 1917, SEWALL states that he is writing with the keen conviction that no systematic effort toward the control of heart disease is possible until the practitioner of medicine assumes the position of view regarding the prevalence of cardiac disease that he has slowly been coming to take as to tuberculous infection of the lungs, that it is to be distinctly excluded in every case coming to diagnosis, and that in our study of the heart we should cease to await the development of the signs of mechanical imperfection, much as in the diagnosis of cancer of the stomach we no longer wait for a palpable tumor. In the clinician must learn to recognize

disease while it is still a clinical disorder and before its morbid anatomy leads to physical signs.

A mechanical break in cardiac compensation probably finds its chief danger in degradation of cardiac nutrition and consequent depletion of resistance toward infective agencies.

As to treatment, when cardiac infection threatens to develop or when acute inflammation has already supervened, there is one fundamental resource without which nothing is of avail—complete mental and physical rest.

In chronic cases, which are apt to be overlooked unless previous infection has caused mechanical derangement of the valves, it would seem that we cannot do better than to act on the hints from our hard-won experience with tuberculosis.

In an arrested case of tuberculosis, the patient is functionally normal within certain limits; not to overstep these bounds requires a mode of life ordered according to the rules of hygiene which must be carefully adapted to the needs of each person.

DAKIN'S "DICHLORAMINE-T" IN THE TREATMENT OF THE WOUNDS OF WAR.

SWEET in the *British Medical Journal* of August 25, 1917, makes a report upon this important antiseptic which has attracted so much attention during the last few months. He has treated some eighty patients with Dakin's "dichloramine-T"; some have been old cases with foreign bodies lying in the bone, and suppuration did not stop until the foreign body was removed. Fresh cases, in which enough integument was left to permit it, have been treated with dichloramine once and immediately closed, and have healed by secondary intention. Sixteen cases, old and fresh, were cultured after treatment with "dichloramine-T" for varying periods, of which eleven gave no growth whatever; of the five in which a growth appeared, four were old cases of deep bone involvement; the only growth was the staphylococcus aureus in four cases and in one case the pyocyanus.

The wounds filled rapidly with granulation tissue of healthy color, which exhibits no tendency to exuberant growth and no tendency to become water-soaked and indolent; the skin edges grow in very rapidly.

These results are no different from those which can be obtained by other methods, and no one would believe them if they were any better. Let Sweet say, therefore, that the surgeons of the unit are agreed that the wounds treated by "dichloramine-T" are in every way as satisfactory as they have ever seen under any method; and two of the surgeons have had previous experience in France, while all are surgeons of long experience in civil practice.

The results along other lines are capable of more definite demonstration, and it is on these that Sweet lays the most emphasis.

The new "dichloramine" solution is made by dissolving the crystals of "dichloramine-T" in chlorinated eucalyptol and then diluting this solution by the addition of chlorinated paraffin oil. It is best applied by an oil spray, an ordinary hard-rubber or all-glass atomizer being the most practical method. Metal atomizers are not suitable, since the metal is attacked by the chlorine. This oily solution presents the first great advantage—the dressings do not stick to the wound and the entire act of dressing is relatively painless. The gauze does not have to be separated from the granulations by soaking. It is therefore not even necessary in the average wound to place a waterproof protective covering over the bed-linen while dressing, and the necessity of moving the part or the patient is obviated. The old dressing is simply lifted off, and the wound sprayed; the force of the spray will dislodge sloughs, and the wound is covered with a fresh dressing. It is evident that a very important saving of time results from this simplicity of dressing. One surgeon has repeatedly dressed thirty wounds in ninety minutes—an average of three minutes to each dressing. These figures, and the figures to be given later, refer to the acute wards, where the patients are all bed patients.

The solution contains enough available

antiseptic so that one dressing every twenty-four hours is ample for large, deep wounds, and one dressing every forty-eight or seventy-two hours is enough for the simple or more superficial wounds. Since the solution contains so much chlorine, and does not have to be renewed every few hours, the use of the Carrel tube is entirely done away with. The oily solution of "chloramine-T" creeps into all the wound crevices and corners, and it can be readily introduced into sinuses by means of a cotton swab dipped into the solution.

The amount of this new solution needed for wound dressing should be emphasized. At first thought it would seem that a solution containing oil of eucalyptus and paraffin oil would be far too expensive for general use in comparison with eusol. Forty-two wounds were dressed by one surgeon with 35 Cc.; another surgeon dressed 154 wounds with 115 Cc. These figures apply to the acute wards, and include many compound fractures and extensive buttock and thigh wounds. The fact that so little fluid has to be used, and that therefore only the wound discharge has to be cared for, results in a tremendous saving of gauze and cotton. Sweet gives below a table of the results of a comparison of the amount of gauze and cotton used during different periods in the four acute surgical wards of the hospital. Each ward is in charge of surgeons of equal skill, and all trained in the same hospital; the nurses are also all graduates of the same hospital training school; in other words, the comparison is not between workers trained in different schools of surgical technique.

TABLE I.—GAUZE AND COTTON-WOOL USED JULY 5TH, 1917.

Ward.	Gauze (6-yard rolls).	Cotton (1-yard rolls).	Treatment.	No. of Patients.
1	12	2.5	Eusol	23
2	10	4	Eusol	22
3	3.5	2.5	Dichloramine-T	23
4	6	2.5	Eusol	25

Taking a longer period, the amount of gauze and cotton used in seven days by three of the acute surgical wards is given

in Table II. Ward 2 changed during this period from the use of eusol to the use of "dichloramine-T;" the figures from this ward are therefore not available. The number of patients was the same in the three wards, and the proportion of relatively slight and extensive wounds in each ward was the same.

TABLE II.—GAUZE AND COTTON-WOOL USED FROM JULY 4TH TO JULY 10TH, 1917, INCLUSIVE.

Ward.	Gauze (6-yard rolls).	Cotton (1-yard rolls).	Treatment.
1	72	38.5	Eusol.
3	33	7	Dichloramine-T.
4	45	18	Eusol.

This saving of material is of importance in several ways. Not only does it effect a saving of labor from the cotton field to the hospital, not only a saving of transport, but an important saving in the hospital itself; the time taken by the nurses in the preparation and sterilization of material can be utilized for the care of the patients, and to this can be added the saving in time, labor, and material by doing away entirely with the need for the Carrel tubes. This need for so little solution in wound dressing, and the fact that the dressing need only be sufficient to care for the wound discharge, mean that the bed-linen is not wet, with a consequent saving in the moving of the wounded, and an increase in their comfort and well-being.

The dichloramine-T solution, like all other chlorine compounds, is a very active lymphagogue in fresh wounds, and the amount of wound excretion may be considerable. The lymphagogic effect may be directly watched in suitable wounds. As granulation tissue develops, the lymph discharge greatly decreases until the wound becomes comparatively dry. The dichloramine-T also possesses to a marked degree the characteristic power of the chlorine solutions in aiding the digestion and removal of the necrotic sloughing tissues. The new solution seems more effective in cleaning up sloughing tissue than the older chlorine compounds. While the majority

of Sweet's cases come from the casualty clearing station in excellent, clean condition, a sufficient number have reached him with necrotic tissue in the wound amply to satisfy him of the rapidity with which the dead tissue is freed under the dichloramine-T. The tendency to secondary hemorrhage is certainly not increased. He has had only one secondary hemorrhage in the series, which includes a number of deep buttock wounds and cases of exposed great arteries of the arm and leg.

The solution is not irritating to the skin or mucous membrane, except possibly in the rare individual who possesses an idiosyncrasy to the eucalyptus oil. Such individuals have been reported in dermatological literature. Among the patients treated in the U. S. Army Base Hospital No. 10, France, Sweet has encountered only one case of dermatitis, but since it did not develop until after two weeks' use of the solution and was accompanied by high temperature, it is not clear that it should be ascribed to the eucalyptus oil or to the well-known action of wound excretion.

The constituents of the solution are stable, although the final combination is not indefinitely stable nor can it be exposed to strong light. It is easily prepared from the constituents. The dichloramine-T which Sweet has was put up in packages of 10 grammes each; the content of one package is dissolved in 75 Cc. of chlorinated eucalyptol and diluted with equal parts of chlorinated paraffin oil as needed, making, therefore, approximately a 6.5-per-cent solution of dichloramine-T.

The first application of the solution to a fresh wound produces a smarting or burning sensation, which passes away in a very few minutes; in some individuals this seems quite severe, but Sweet has yet to see the patient who does not prefer this slight smarting to the real pain of removing a wet dressing which has dried around the edge of the wound. After the second or third application this smarting sensation on applying the solution seems to have disappeared.

Since the time to treat an infection is

before the infection starts, it is hoped that the dichloramine-T solution can be given an early trial at the field ambulance and casualty clearing stations.

Conclusions.—Dakin's "dichloramine-T," in solution in eucalyptol and paraffin oil, is of great advantage in treatment, even if the final results in wound healing were no better, because—

1. It saves the pain of wound dressing.
2. It effects an appreciable saving of dressing material.
3. The amount of solution needed is of small bulk.
4. The number of wounds which a surgeon can dress in a given time is far greater than by any other method.
5. The elimination of the Carrel tube simplifies the dressing and the problem of transportation of the wounded.
6. The elimination of the Carrel tube saves the time taken by the nurse for the periodic flushing.

THERAPEUTIC USES OF TUBERCULIN IN UVEITIS.

WOODS in the *Maryland Medical Journal* for June, 1917, states that the following conclusions seem to present the proper attitude of ophthalmologists to the use of tuberculin for diagnosis or therapeutic purposes:

First, avoidance of focal reaction in intraocular lesions; second, avoidance of tuberculin as a therapeutic measure in acute cases. Under "acute" there should be included duration and advance of the lesion as indicated by condition of the vitreous, descemetitis, etc. Third, tuberculin is indicated when the trouble is non-progressive, but does not get well; fourth, a positive Von Pirquet, with elimination of other causes, is sufficient basis for the use of tuberculin in therapeutic doses; fifth, the present status of vaccine therapy is so uncertain, in the opinion of even those most expert and experienced, that ophthalmologists owe it to their patients to conduct this treatment under the guidance of one trained in "immunologic problems."

THE USE OF RADIUM IN THE TREATMENT OF CUTANEOUS EPITHELIOMA AND KERATOSIS SENILIS.

In concluding a paper in the *Boston Medical and Surgical Journal* of May 31, 1917, BURNS asserts his belief that radium effectively heals epithelioma and keratosis senilis. The cosmetic results following its use are excellent. An especial field of usefulness is about the nose and eyelids, where surgery is difficult and the results deforming. An advantage over x-ray therapy is the accuracy of dosage and the greater margin of safety.

THE USE OF THE LONGITUDINAL SINUS FOR DIAGNOSTIC AND THERAPEUTIC MEASURES IN INFANCY.

The *American Journal of Diseases of Children* for June, 1917, contains an article bearing the above heading, which is somewhat radical in its wording. BROWN and SMITH state in this paper they are able to report 100 cases in which the sinus has been used either for diagnosis or for therapeutic measures. Blood has been withdrawn for a Wassermann test in thirty-nine cases, ranging in age from birth to the oldest, 8 years and 5 months. In the latter the anterior fontanel was one inch across and half an inch in the anteroposterior direction. It was quite firm, but fibrous, and presented no more difficulty in entering the sinus than one would expect from the nature of the tissue at that age. In these cases and the remaining cases the sinus was entered in one or more of three locations: first, the anterior angle of the fontanel; second, the posterior angle of the fontanel; third, along the line of the sagittal suture at a distance of $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches behind the fontanel. They have been equally successful in the three locations, and think that, usually, the one has no advantage over the others. The three locations, however, give three chances for entering the sinus if any difficulty, as occasionally happens, is encountered.

Diphtheria antitoxin has been given in two instances, one being in a ward case,

and the second, in an infant seen in consultation, three weeks old, with a bad diphtheritic throat of three days' duration. extremely ill, the infant having had no serum. It was thought that the only chance of saving the infant was by the intravenous injection of a large dose of antitoxin. Twenty thousand units were accordingly given, by means of the sinus route, in a few minutes. This method of giving antitoxin should prove very valuable and save lives that otherwise might be lost.

It was with the view of giving the most intensive treatment for syphilitic infants that they first turned to the sinus in their search for a method of doing this easily and rapidly. Up to the present they have given fifty-two injections by this method. When one remembers the areas of necrosis following accidental subcutaneous injection of diarsenol or salvarsan, this fact will be apparent, that the injection is a good test of the efficiency of the sinus in therapeutic treatments. No cases have occurred in which irritation has followed the injection of the arsenical salts. In one instance adhesions or thrombosis may have occurred, although their only ground for suspecting this was the difficulty experienced in entering the sinus after six injections had been given. This was the first case in which they had given the diarsenol this way, and their difficulty may have been due to lack of experience. The case went on to complete recovery, however, with repeated negative Wassermann tests. In all their other cases they have had no difficulty in giving repeated doses, so that they feel justified in concluding that thrombosis practically never occurs in the sinus as it does in the small veins following the injections.

Having in view the use of the sinus for transfusing purposes, four infants were given a saline solution, using the 20-Cc. syringe to see if any difficulty would arise while changing the syringes with the needle in the sinus. It was found by putting petrolatum on the top of the syringe, and with an assistant preventing the needle from turning by means of an artery forceps,

that the syringe could be removed and replaced without any difficulty. Judging from these saline cases, the ease and rapidity with which the solution was injected, there is no doubt that an infant could be given 100 Cc. or more of blood in a few minutes. The most interesting and practical point is that this could be carried out at the bedside and with only a few minutes' preparation. To emphasize the ease and rapidity of an injection, it may be added that four injections of diarsenol have been given by one of the authors in fifteen minutes, this including the preparation of each individual dose, the preparation of the infant, etc. Any one who has worked with the veins in infants will appreciate the importance of this statement as an evidence of the value of this procedure as a time-saver.

Three cases for blood culture by the Rosenau method were carried out. There was no difficulty in getting sufficient blood, the parts being easily prepared and rendered aseptic. The authors have in mind the use of the sinus for giving sodium bicarbonate solution and for other therapeutic measures, but owing to being short-handed and having had extra work thrown on them, they are unable to report these cases at present.

SURGICAL ASPECTS OF MALE STERILITY.

In the *New York Medical Journal* of May 26, 1917, WOLBARST reaches these conclusions:

1. The treatment of sterility in marriage requires the most careful study of the generative organs in both parties, preferably simultaneously.

2. A woman should never be subjected to surgical measures for sterility unless her husband has been carefully examined and found capable of fertilization by the systematic efficiency test.

3. In the male spermatic efficiency, judged by the presence or absence of azoospermia, oligospermia, and necrospermia, must be determined.

4. To give trustworthy results, sperma-

tozoa must be examined immediately after emission in contact with the natural female secretions.

5. In a study of eighty-seven cases, fifty per cent were due to azoospermia, thirty-five per cent to oligonecrospermia, and 18.5 per cent to oligospermia.

6. Bilateral epididymitis caused azoospermia in seventy-two per cent of cases; prostatitis, vesiculitis, and colliculitis caused oligospermia and necrospermia in seventy-two per cent of cases.

7. Sexual exhaustion (excessive coitus) is a frequent indirect cause of sterility.

8. Gonorrhea is the underlying factor in sixty-seven per cent of azoospermia; forty-two per cent of oligospermia; fifty-five per cent of oligonecrospermia. Sixty per cent of the total number were due to gonorrheal infection.

9. Syphilis appears to be a slight factor in male sterility.

10. Lesions responsible for the sterility were discovered through the posterior urethroscope in forty-seven per cent of cases.

11. Treatment is surgical and must be applied either to removing the obstruction to the passage of the spermatozoa or to removing the pathological genital secretions which injure or destroy them.

12. Artificial impregnation is indicated in cases of subnormal spermatic efficiency, and is often successful.

13. The probability of cure, excepting in azoospermia, is about thirty-three per cent. In azoospermia much less.

GLYCERIN AND ANTISEPTICS.

In the *British Medical Journal* of May 19, 1917, GOODRICH states there is no doubt that in a mixture of water and glycerin more of the ordinary antiseptics will dissolve than in pure water; for example, in a mixture of equal volumes of water and glycerin about five times as much thymol will dissolve as in pure water. However, the resulting solution has no better antiseptic power than the aqueous solution containing only a fraction of the amount of

thymol, as already recorded in the writer's recent paper on mouth-washes. The same is the case with boracic acid: a saturated solution in water will kill all the organisms in a thin film of staphylococcus pyogenes aureus in just over one hour, whereas a saturated solution in water and glycerin containing more than four times as much boracic acid requires about six hours.

Hitherto it appears to have been assumed by pharmacologists that solutions in glycerin were necessarily more antiseptic than the more dilute aqueous solution, and further statements such as the following are liable to be misleading: "Glycerin is largely used in pharmaceutical preparations as a solvent, and, being an antiseptic, it also acts as a preservative" (Squire, 1916, p. 658). It was Sternberg who included glycerin, up to 1 in 4 dilutions, among feeble antiseptics, but even water compares well in disinfecting power with 50-per-cent glycerin. Pure glycerin easily kills protozoa and other animals, but here it acts by osmosis, for it is well known to extract water from tissues. Many bacteria are much less susceptible to fatal effects from drying, and may consequently remain alive in glycerin for hours. Dilute solutions are not even preservative; in fact, up to 8 per cent, glycerin is so beneficial to certain bacteria as to be added to media for growing them.

The experiments mentioned below were carried out in the same way as those described in the writer's recent paper in the *British Medical Journal* of April 14, but with a standard culture of *S. pyogenes aureus*. The glycerin used was in the liquid form (specific gravity 1.26), pure and perfectly sterile.

To destroy all the organisms on a cover-slip film pure glycerin required approximately eight hours; mixed with water in equal volume it required more than twenty-four hours, after these hours giving considerably more growth than the control which had been in tap-water for the same time. For the following experiments a stock solution of the antiseptic was made in water, and this was diluted as required with an equal volume of water or glycerin.

Time Required to Destroy All the Individuals from a Standard Culture of S. Pyogenes Aureus Contained on a Thin Film on a Cover-glass.

Phenol:

3.3-per-cent solution in water required less than $\frac{1}{4}$ minute.

3.3-per-cent solution in water and glycerin required more than 1 minute (between 1 and 5).

Mercuric Chloride:

0.005-per-cent solution in water required approximately $\frac{1}{4}$ minute.

0.005-per-cent solution in water and glycerin required more than $\frac{1}{2}$ minute.

Boracic Acid:

A saturated solution (4 per cent) in water required approximately 65 minutes.

A half-saturated solution (2 per cent) in water required approximately 285 minutes.

A 2-per-cent solution in water and glycerin required more than 480 minutes.

Thymol:

A saturated solution (0.06 per cent) in water required $\frac{1}{4}$ minute.

A half-saturated solution (0.03 per cent) in water required 12 $\frac{1}{2}$ minutes.

A 0.03-per-cent solution in water and glycerin required more than 300 minutes.

In the case of thymol and *S. pyogenes aureus* the value of the constant in the logarithmic relation existing between the time required for disinfection and concentration, as given by H. E. Watson, is 5.6. This is almost exactly the same as that for phenol and *S. pyogenes aureus*, calculated from Chick's results, obtained in an entirely different way. However, the discussion of methods, etc., must be deferred and published with the graphs representing the variations in times required for disinfection with concentrations of these antiseptics; especially interesting are those showing the interference of glycerin and other solvents.

The theory underlying the action of glycerin is most interesting; possibly the glycerin merely acts as oil is supposed to act in the case of carbolic acid—that is, being a better solvent for the antiseptic, the latter does not diffuse so easily from the solution into the watery protoplasm. However, in some ways this explanation is unsatisfactory, and the fact that glycerin diminishes the action of aqueous mercury perchloride solutions suggests that, like alcohol, it does so by diminishing dissociation. There seems to be some difference of opinion about the dielectric constant of glycerin, but probably it is less than that of

alcohol (25), so that it would as a solvent have even less dissociating power. As far as Goodrich knows, it is not generally considered, in the case of such substances as phenol with small dissociation constants, that the antiseptic properties of the solutions rest in the ions; but that such is the case is the most likely explanation which she can at present bring forward to account for the above results.

Whatever the theoretical explanation, however, it is quite clear that in practice it is more than useless to waste glycerin by using it as a solvent for antiseptics, and surely such preparations as glycerin of phenol and glycerin of boric acid should be omitted from the Pharmacopœia. Probably, in any cases where thymol solutions have been found to be unsatisfactory as mouth-washes, the failure is due to the presence of glycerin in them, as in many proprietary mouth-washes in common use.

THE PLACE OF RADIUM IN THE TREATMENT OF CANCER.

ABBE in the *Medical Record* of June 2, 1917, reminds us that radium acts by its enormous and perpetual output of electrical units, shooting out through space infinitely small atoms, each carrying a charge of electricity, some positive, some negative; if indeed, as has been surmised, they are not electricity itself.

The negative electrons (beta rays) have been demonstrated to be the efficient factor in repressing cell growth. The first light is thus thrown on the question of why cells grow. In their disorderly overgrowth they are suddenly restored to orderly action, by supplying them with their lost negative electrons. Logically this implies that their formerly orderly existence was sustained in equilibrium by a due supply of negative charges.

Incidentally, we must recognize the fact that science is about ready to concede that electricity is the vitalizing force actuating all the functions of our life and our cell activities.

It is not surprising that we see, in certain

milder epithelial cancers, in myeloid sarcomas, in round-cell sarcomas, in papillomas, a rapid, complete, and apparently permanent disappearance of the tumors, when the correct dosage of radium electrons has been shot into them. It is like quelling a riot, without killing the rioters, and is followed by a resemblance of the cells to correct life order.

To illustrate—an eyelid is engulfed in a tumor so that its edges, the eyelashes, the skin, and shining membranes are effaced in the mass. One correct dose of radium is given. In two weeks shrinkage has begun; in four weeks the tumor is half gone; in eight weeks the lid is restored—smooth surface inside, sharp edge and skin outside. Soon the hair grows in, and in due time one cannot tell on which lid the tumor had grown. Such a case Abbe watched for ten years. The lid remained perfect.

Again, a lad had a lower jaw-bone destroyed for an inch and a half by a soft sarcoma originating in the marrow cells. Radium quickly altered it; retrograde changes ensued; the cells resumed their bone-forming function; gritty points first came throughout the soft mass; then solid bone; then shrinkage, until it took its old shape. Thirteen years have gone by with no recurrences.

Many uterine fibroids (muscle structures) have been partially or wholly reduced by radium and remained so up to twelve years in some instances.

These only illustrate what has happened to thousands of cases. A few such exalt the statistics, no matter how many imperfect results are encountered—failures which skill and time will correct.

But these, it will be said, are not cancer. A Spanish proverb says, "Well lathered is half shaved," and the observations Abbe has made prepare us to understand something of the nature of all cell tumor change under radium.

There is observed a difference in resistance of various types, fibrous structures are hard to affect, although an exception may be made of keloids, which always yield to radium. Cancer is, perhaps, the most re-

sisting of all soft-cell tumors to the subtle powers of radium. There is a growing list of our ardent professional brothers striving to remove this stigma from surgery. The basis of hope lies in the proof that true cancer nests can be influenced by radium to cure themselves, quite as readily as other tumors.

For example, in the early marginal recurrence of true cancer after, we will say, a breast amputation for malignant tumor, the nests of disease disappear under a short radium treatment, and stay cured, unless they have grown to a considerable size. It is not necessary to cut these out to say what they are. Who will say then that the cancer cells are not amenable to the beneficent action of radium?

It is true that if we attack large cancer masses we liberate toxins and weaken the patient for a time. Hence some disrepute has fallen on zealous radium operators, but the disgrace falls rather on the patient or physician, who has allowed delay. The campaign of education is correcting that.

Meanwhile what triumph can radium claim in other cases? One field offering poor hope without radium is opening to us. That faithful pioneer, Dr. Wickham of Paris, strongly urged the use of radium after operation, where even some malignant remnants were necessarily left in the wound. It means the combination of good surgery and radium. Abbe was impressed by cases he showed him twelve years ago, and now esteems the method more than ever.

THE THERAPY OF PELLAGRA.

In the *Medical Record* of June 2, 1917, NILES, who has written so largely on this subject, asserts that the application of medicinal remedies in pellagra is, in the opinion of the writer, fruitful of much benefit. Many of the most distressing symptoms can be either relieved or mitigated, and just because a positive specific has not been found is no reason why a therapeutic pessimism should be allowed to dampen the ardor of the physician. Therapeutic pessimism is the inevitable refuge of

the weakling, and if the medical attendant is imbued with that spirit he should hesitate in treating pellagra.

For the sore mouth and tongue an application of nitrate of silver (20 grains to the ounce of water) daily or on alternate days is recommended. A mouth-wash of boroglycerin (25 per cent) or half-strength liquor alkalinus antisepticus, or a combination of chlorate of potash and glycerin, with rose-water as a vehicle, will generally prove satisfactory. For the aphthous ulcers, oftentimes so painful, gentle "touching" with half-strength aromatic sulphuric acid once daily, or a liberal application of a mild solution of salicylic acid in glycerin and alcohol, will be sufficient.

For the salivation give 1/200 grain atropine every four hours till the dribbling ceases; then stop, for the continuance of the atropine would cause uncomfortable dryness of the mouth and fauces.

Should the interior of the buccal cavity and fauces become dry and uncomfortable, a frequent spraying with liquid albolene, to which a little menthol has been added, will prove most grateful.

As a constitutional treatment the writer recommends the following, which has been evolved from his own experience, augmented by suggestions from others in whom he has confidence.

At present the writer employs for hypodermic use 16-minim ampoules of iron arsenite solution, and ampoules of sodium cacodylate, 1 Cc., each ampoule containing $\frac{3}{4}$ grain of the drug. One of each is injected on alternate days, injecting them under careful aseptic precautions. This injection on each day, but alternating the drug, is kept up for two or three weeks; then the injection is given every second day, still alternating the ampoules, for two or three weeks longer. After that the injections are given only about once a week (still alternating) as long as it is practicable or considered advisable.

Internally it is recommended that a combination of Fowler's solution and a saturated solution of potassium iodide be given, beginning in 5-drop doses and increasing

one drop daily until the physiologic limit is reached. Generally the puffiness under the eyes appears when about 25 to 30 drops are being taken. When this appears the drops should be discontinued for two days, and started at the minimal dose of 5 drops, increasing gradually as before. Some can take larger doses without discomfort than others, but it answers no good purpose to push it after the physiologic limit has been reached. Occasionally the patient, on account of excessive irritability of the alimentary tract, will prove intolerant of arsenic internally. Should this be apparent, the saturated solution of potassium iodide alone may be pushed, given in a little sweet milk.

This is the formula:

Liquor potassii arsenitis, 3 drachms;
Saturated solution potassii iodidi, 5 drachms.

The number of patients who could not tolerate this formula have been extremely few.

After the active symptoms of pellagra have abated, and iron does not seem to be indicated, this formula may be kept up almost indefinitely in 6- or 8-drop doses three times daily.

For the frequent diarrhea, bismuth-beta-naphthol and resorcin, given with milk of bismuth as a vehicle, has generally been sufficient. This failing, there may be given heavy doses of bismuth subgallate. As a last resort, powdered opium or tincture of opium may be used, but opium, as an intestinal astringent in pellagra, has its disadvantages, as it seriously interferes with the much-needed elimination. The writer prefers 10-grain doses of tannigen, given as indicated by the severity of the diarrhea.

When there is a paucity or absence of free hydrochloric acid in the gastric secretions, 10 or 12 drops (not more) of dilute hydrochloric acid; well diluted and given thirty minutes after meals, will often greatly aid digestion and lessen the "heavy feeling" so much complained of.

For the anorexia, tincture of nux vomica, condurango, calumba or quassia, with compound tincture of gentian or cinchona as a

vehicle, will often sharpen an indifferent appetite if given a short time before meals.

In anemic or cachectic conditions the various ferruginous preparations are indicated, as well as cod-liver oil, olive oil, or official preparations of the hypophosphites.

A malarial complication, often present, either openly or latently, will require the addition of quinine, which may be administered in the most eligible form.

Constipation, when present, may be controlled by castor oil or enemas, drastic cathartics being inadmissible. In these infrequent cases of constipation in pellagra an injection of 2 to 4 ounces of cotton-seed or olive oil, introduced into the rectum on retiring and kept in all night, will generally produce a soft, unirritating and effectual evacuation of the bowels the next morning. The writer is also employing, with good results, the liquid paraffin, given as required—generally a tablespoonful night and morning. Mention might also be made of phenolphthalein, which, in 1- or 2-grain doses at night, is followed by satisfactory movements.

The symptoms of nervous irritation, expressed by burning hands, feet, or mouth, will often tax to the utmost the resources of the physician. These may be combated by compresses saturated with a mild solution of bichloride of mercury, ice cold, and applied at frequent intervals; by baths in hot mustard water or slightly mentholated applications of liquid albolene. In occasional instances this burning becomes so intolerable as to require an anodyne.

The aches and shooting pains may often be alleviated by 5-grain doses of acetylsalicylic acid, given four times daily. This sometimes burns the stomach, but not often. Phenacetine, to which is added a small amount of citrate of caffeine, may also be employed for the headache or the different neuralgias. Massage in some instances affords decided relief in muscular pains, and the rubbing in of a gently stimulating liniment is not amiss.

The erythema, being a secondary symptom, should receive only palliative treatment. Too many applications tend to irri-

tate more than soothe, and too many ointments can sometimes transform a dry erythema into a moist one, which is far from being desirable.

While the hands are red and hot, a lotion, as suggested by Dr. Babcock, is serviceable:

Pulv. calamine, 4 drachms;
Pulv. zinc oxide, 3 drachms;
Rose water, 2 ounces;
Lime water, to make 1 pint.

This may be applied ad libitum.

After desquamation begins, there are several mild ointments available.

The writer has used with satisfaction the 5-per-cent boric acid ointment. Dr. Babcock recommends:

Pulv. calamine, $\frac{1}{2}$ drachm;
Zinc oxide, $\frac{1}{2}$ drachm;
Olive oil, 1 drachm;
Lanolin, to make 1 ounce.

Gentle cleansing of the scales or crusts, after having been softened with some oily substance, will promote the comfort of the patient.

When other applications to sore and crusted skin have failed, the writer recommends the scarlet-red ointment (Heilkraft). This may be applied once or twice daily and is quite efficacious. An objection to its use is the stain it produces upon any article it touches.

When the erythema attacks the eyelids and sympathetic conjunctivitis ensues, a weak solution of argyrol dropped in the eyes will generally prove adequate for relief.

For great exhaustion, the intravenous injection of saline solution (300 Cc.) every day or alternate day is suggested.

For the mental and psychic symptoms, appearing as they do in such multitudinous forms, only general suggestions can be made. To treat these manifestations by any rule of thumb would be irrational and fruitless.

Sleeplessness may be combated by chloral, trional, or veronal. By the addition of phenacetine to veronal the good effect is augmented and disagreeable after-effects prevented. Morphine or codeine for insomnia is to be deprecated.

Tincture of opium or powdered opium is useful for the melancholia, but the drug must be aided by isolation and rest.

When the mental symptoms deepen into the more pronounced forms of melancholia or lapse into dementia or amentia, the patient should be put in an institution for the mentally sick. These unfortunate invalids are subject to so many varying moods, suicidal and otherwise, that it is impracticable to properly and safely care for them at home.

While many of the pallagrous neuroses and psychoses are the result of degenerative changes, where scar tissue impedes and cuts off conduction, still, in many instances, if the treatment is persisted in with a spirit of optimism, unexpected improvement may brighten a gloomy prognosis and light may emerge from sad obscurity.

We are not as yet thoroughly conversant with the influences of the mind over metabolic processes upward or downward, and while due caution should always be observed in any predictions, no one man nor set of men are privileged to abrogate the function of a supreme court by asserting that pellagra is an incurable disease, and that medical treatment is valueless.

PERFORATION OF THE NASAL SEPTUM DUE TO THE INHALATION OF ARSENIC TRIOXIDE.

DAVIS in the *Journal of the American Medical Association* of June 2, 1917, says that perforation of the septum due to exposure to the salts of arsenic—the fumes produce systemic but not local effects—appears to be quite common, but the literature is scanty. Our knowledge of this condition is thus summarized by Kober and Hanson:

The most characteristic lesion produced on the upper air-passage is perforation of the septum of the nose varying in extent from a circular hole one-eighth to one inch in diameter. Perforation may be complete in a month from the time of commencement of work. The anterior and lower margin of the cartilage and the bones to which they are attached never become involved in the ulcerative process, so that deformity is absent, thus distinguishing the condition

easily from that due to syphilis. Once the perforation is complete no further inconvenience is felt; not a few of the workers are ignorant of the existence of the condition.

The effects of the perforation are negligible. The ulceration ceases when the limits of the cartilaginous septum have been reached and the edges heal over. Bamberger says that elderly persons and snuff-takers are less liable to perforation of the septum than are the young and those who do not use snuff. Mitchell says that nothing that has yet been done has served to diminish the frequency of perforation of the septum. The inconvenience caused by the lesion does not seem to be sufficient to induce men to make trial of such expedients as plugs of cotton-wool in their nostrils or, as has been proposed, painting the septum with paraffin. In short, preventive measures resolve themselves into the suppression or removal of dust and fumes, attention to cuts and abrasions, periodic medical supervision, and cleanliness.

The lesion in the nasal septum of chrome workers appears to be quite analogous in its development and course to that produced by arsenic trioxide in the two cases described in this report.

A METHOD OF TREATMENT OF MERCURIC CHLORIDE POISONING.

WEISS in the *Journal of the American Medical Association* of June 2, 1917, states that in bichloride poisoning he gives alkali, hypertonic salt solution by mouth, by rectum, and intravenously. Freyhof and Weiss have modified the old English potus imperialis. This modification, which they call "imperial drink," consists of potassium bitartrate, 60 grains; sodium citrate, 30 grains; sugar, 60 grains, with lemon or orange juice to taste, to 8 ounces of water. This makes a pleasant alkaline drink, which is best made by placing the potassium bitartrate and sodium citrate in the lemonade just before it is used. In conjunction with this, Weiss uses intravenous injections of Fischer's solution, which consists of sodium

carbonate crystals, 10 gm., and sodium chloride, 15 gm., to 1000 Cc. of water.

The treatment begins on the arrival of the patient, which is usually within a few hours after the drug has been taken. The stomach is washed with 1 quart of milk and the whites of three eggs, followed by water. A sample of gastric contents is saved for examination. Before the stomach tube is removed, 3 ounces of magnesium sulphate in 6 ounces of water are introduced and allowed to remain in the stomach. The patient is then given a soap-suds enema. The enema and catharsis rapidly open the gastrointestinal tract, thereby aiding in the elimination of mercury. If the patient does not vomit immediately after swallowing the poison and does not reach medical aid for at least three hours later, an intravenous injection of Fischer's solution is given at once in amount ranging from 1000 to 1500 Cc., depending on the condition of the heart of the patient. If there is no evidence of cardiac derangement, 1500 Cc. of fluid intravenously are readily tolerated without any disturbance. Then the patient receives from six to eight glasses of imperial drink a day, and he is given large quantities of water by mouth. He is allowed a liberal diet—almost anything except an excess of protein foods.

Weiss uses the analysis of the urine as the control of the treatment. The patient should void large quantities of urine, as he is taking large amounts of fluid. He endeavors to keep the urine alkaline to a saturated solution of methyl red in alcohol, for Fischer has shown that if the urine of a nephritic cannot be made alkaline to methyl red, this patient continues in a dangerous state. An animal poisoned with mercury is at least a potential, if not an actual, nephritic. Almost all of the patients develop an albuminuria early, but this gradually, or occasionally rapidly, disappears, as soon as sufficient alkali can be introduced into the body to counteract the abnormal amount of acids produced.

Weiss has had complications in only one patient; he developed a severe necrosis of the mucous membrane of both sides of the

cheek, and later in the course of the disease he had severe intestinal hemorrhages, in all probability from the colitis produced by the mercury excreted through the bowel. Similar cases were described by Lambert and Patterson.

Up to the present time Weiss reports fifteen cases personally treated and ten cases similarly treated in other parts of the hospital. The series began in July, 1915, and continues to the present time.

These twenty-five patients were discharged from the hospital, free from any discoverable symptoms of mercurial poisoning. There were no fatalities. The amounts taken by these patients, according to their own statements, varied from 3 to 82 grains of mercuric chloride, all taken by mouth.

OXYGEN MINE RESCUE APPARATUS AND PHYSIOLOGICAL EFFECTS ON USERS.

In Technical Paper No. 82 of the Department of the Interior, HENDERSON and PAUL report on this topic. They state that what is desirable in the way of change in the forms of apparatus hitherto in use is not that they should be made all alike, but rather that each should retain those features in which it excels and should be improved in those in which it is defective. To this end the following recommendations are offered:

1. The helmet of the type used with the Draeger and the Westfalia apparatus should be entirely discarded. Any device of this type which may be invented in the future should have a dead space of not over 200 Cc. and should be tested with the utmost care as to its tightness upon the face.

2. A self-adjusting oxygen feed valve should replace the fixed feed valve now used. Whenever the fixed feed valve is used it should be set to a flow of not less than 3000 Cc. as a minimum per minute, measured at a temperature of 60° F. and a barometric pressure of 30 inches of mercury.

3. The arrangement for artificial circu-

lation in the Draeger and the Westfalia apparatus should be eliminated and replaced by a natural circulation. When the Draeger and Westfalia are used in their present forms the automatic circulation should not be less than 75 liters per minute. The injector should be placed between the exhalation bag and the absorber so as to decrease to the smallest possible limits the area in which a negative pressure occurs.

4. The weight of the entire apparatus should not be in excess of 35 pounds.

5. The absorption of carbon dioxide should be so nearly complete that the air in the circulation system during moderate exercise will not contain more than 0.5 per cent of carbon dioxide, and at no time, even during the most vigorous exercise, more than one per cent. The absorber should be capable of fixing at least 2.5 liters of carbon dioxide per minute.

6. A by-pass valve should be made a part of the apparatus, to be used in case of failure of the reducing valve, for refilling the breathing bag should it be pressed flat, and for renewing the air contained in it in the event of poor absorption of carbon dioxide.

7. An automatic relief valve should be provided that can also be operated by the hand or finger. It should be placed on the exhalation bag.

8. The inhalation and exhalation bags should have a combined capacity of at least 8 liters. If a single breathing bag is used, it should have a capacity of at least 5 liters.

9. The breathing bags should be protected against accidental compression when the wearer is crawling through a low passageway.

10. The air within the circulating system should at all points be under a positive pressure of not to exceed 1 centimeter water gauge, to insure that any leakage that may occur shall be outward and not inward.

11. All tubes and valves should be sufficiently large to permit the breathing of 100 liters of air per minute without undue resistance, with a positive pressure not to exceed 5 centimeters water gauge, and no

negative pressure even during the deepest and most rapid breathing.

12. Pressure gauges should be regularly tested in comparison with a standard instrument. They should be calibrated in atmospheres and also in minutes of duration of the remaining oxygen supply, and should be placed where the wearer can easily see them, or provided with some device that will warn him when the supply is nearly exhausted.

13. Couplings and connections should be reduced to the smallest number possible and made strong enough so that even a heavy blow will not dislodge them, cause them to leak, or compress them so that air cannot pass freely through them.

14. The production of heat in the absorber should be reduced to a minimum, and an efficient radiating or cooling device provided.

15. Parts of the apparatus worn on the back should be protected against damage when the wearer is traveling under a low roof. The valve regulating oxygen supply, which in some forms of apparatus now projects to the side, should be protected against accidental closing.

16. In addition to training in a smoke chamber, as now practiced, men who are to take part in mine rescue operations should also be required, while wearing apparatus with full service equipment, to walk or run for ten or fifteen minutes at a pace of five miles an hour, and two hours or more at a varied pace, as herein described. These tests should be made a regular part of the drill and examination of men engaged or liable to be engaged in rescue work. The capacity of each man to sustain the physical effort necessary should also be carefully determined in the manner herein described.

17. Experiments such as those herein described on the effects of carbon dioxide on the resting person, and on the effects of insufficient oxygen or excess nitrogen without considerable increase of carbon dioxide, may also be profitably demonstrated to men under training. It is important for their own safety that men who are to take

part in rescue work should clearly understand the various forms of asphyxia and the premonitory symptoms of each. Such demonstrations should, however, be carefully supervised, as they are otherwise quite dangerous.

THE TREATMENT OF BRONCHIAL ASTHMA BY VACCINES, WITH REPORT OF CASES.

In the *American Journal of the Medical Sciences* for June, 1917, SICARD asserts that asthma is undoubtedly in some cases an expression of anaphylaxis; clinically it resembles the hypersusceptibility produced in animals by the injection of foreign proteid. Patients with this disease become sensitized to some form of proteid by absorption from the nasal mucous membrane, alimentary canal, or from some focus of infection, and react with an attack of bronchial asthma upon an intoxicating dose of the poison (Meltzer). Babcock recalls the case of a sufferer from asthma who was operated upon for gall-stones, with relief of the asthma, and as long as drainage of the gall-bladder was maintained there was no asthma, but with stoppage of drainage it returned; finally, with cure of the gall-bladder the asthma disappeared. Likewise the removal of nasal polyps restores drainage to the accessory sinuses of the nose and relieves a pent-up focus of absorption which has been causing attacks; the removal of hypertrophied turbinates acts in the same way. In some cases the smell of horses or of the stable in a sensitized individual will bring on an attack. Sometimes the injection of horse serum in the form of antitoxin will produce an attack; a friend of Sicard who received a small immunizing dose of diphtheria antitoxin had such a severe anaphylactic reaction with asthma that his life was despaired of. Asthmatic attacks occurring with hay-fever, and due to the pollen of ragweed, goldenrod, etc., are of the same origin; inoculation with constantly increasing emulsions of these pollens, or polyvalent emulsions, will cure or improve the attacks. Egg proteid also causes attacks in some

individuals. Sicard has in mind a child who had asthmatic attacks after eating eggs, and which attacks cleared up after a change in diet. The urticaria following the ingestion of fish is of the same character; likewise the urticaria following the injection of antitoxin.

Another source of attack (and one with which Sicard has been working) is due to the presence of bacteria, primarily streptococcus viridans or streptococcus hemolyticus, secondarily micrococcus catarrhalis. These cases are obviously infective, and the more asthma Sicard sees the larger he thinks this group is; they occur with bronchitis, and sometimes run an acute course with febrile reaction, increase in pulse-rate, cough, and sputum, and are often followed by emphysema.

If the sputum be collected in a sterile cup or Petri dish, washed, and a loop stirred in blood agar and poured in a Petri dish, and later streaked on North's medium, streptococcus can practically always be grown. Whatever the variety of germ, whether streptococcus viridans or streptococcus hemolyticus, an autogenous vaccine will cure the attacks. It is best given twice a week, in constantly increasing strength, for twelve to twenty injections. It is much better to give such dosage that local reaction occurs, although Sicard has had cures in patients who showed no local reaction. On the other hand he has had cases which showed no improvement until doses were given in sufficient quantity to cause local reaction. He has adopted the practice of beginning with 100,000,000 in adults and feeling his way cautiously until finding the dose that caused local reaction, and then provoking a local reaction on every injection. If at any time the local reaction be too severe, or if general symptoms occur in the form of fever, chilliness, general malaise or aches, or increase in the asthma, he allows a rest for a period before beginning again, using his judgment as to continuing the same dosage or dropping back to a smaller one; it is better to avoid going backward if possible. One thousand million is often far enough to carry them, although

more obstinate cases may require 2000 million, and Sicard has carried them to 3000 million and higher. It is very striking to see the asthma clear up after the first injection, as has happened in a number of Sicard's cases. The longest period of cure he has to report is two years. He has been struck with the fact that streptococcus seems to be the chief offender. He has had no pneumococcus cases. Micrococcus catarrhalis, he is convinced, is usually a mouth infection in asthma. He does not find it often in sputum that is carefully washed, and when the specimen for culture is carefully selected. Vaccination by catarrhalis seems to have had very little action on the asthmatic attacks when mixed infection is present. Babcock reports excellent results in a case of mixed infection, in which he used a mixed vaccine of pneumococcus, streptococcus, and an anaerobic bacillus. After inoculation for a time at semiweekly intervals it is usually advisable to make the intervals weekly.

ARTHRITIS DEFORMANS AS AN INFECTIOUS DISEASE.

In the *Journal of Medical Research* for May, 1917, NATHAN states that for clinical and especially therapeutic purposes we must consider this disease from its general and local aspect. Thus the presence of symptoms of general infection, the metastases in other organs besides the joints, the recurrences and the location of the primary focus must be considered as a problem separate from the articular disease.

In this regard a word of caution is indicated. Though it is not unlikely that a focus in a tooth is sometimes and one in the throat is often the point of entry for bacteria, it should be remembered that once the microorganism has entered the blood its connection with the portal of entry ceases. For this reason, though the removal of the affected tooth or tonsils will, if these are really the site of the original focus (which is not by any means always certain even when they are abnormal), prevent reinfection or recurrences, such procedures

have absolutely no influence upon the joint condition as it already exists. Nathan is afraid that this fact is seldom made clear to patients who are persuaded to resort to surgical measures in these organs. Moreover, it must be remembered that a focus in the joint structures, like a focus anywhere else, besides causing local changes, may be and no doubt often is a source of general infection and metastases.

The local articular conditions must be divided into active and terminal stages. The active stage may be short and terminate in complete resolution, or it may last a very long time; that is, it may be chronic. In the chronic conditions it is often of importance, in view of the treatment, to differentiate between epiphyseal and subperiosteal and synovial forms of disease.

In the final stage the terminal condition to be met with is more or less readily differentiated by the objective signs and the radiograph. Thus we can often distinguish between degenerations without loss of passive motion and more or less deformity (dislocation, etc.), fibrous ankylosis, bony ankylosis. It should be remembered that these changes are not typical of a certain class of cases, but may and do occur simultaneously in different joints in the same individual. Finally the presence of concomitant central or peripheral neural involvement must be determined.

When the fact that the joint condition—either non-articular or polyarticular—may remain active and progressive though the general condition has subsided, that the local joint condition varies according to the virulence (but not the cause of the infection), the termination, the mechanical conditions in the joint and the concomitant conditions, there need no longer be any difficulty in understanding and caring for the so-called rheumatoid polyarthritides.

In conclusion Nathan has only a few words to say as regards the treatment of the conditions here discussed. Some years ago he strongly advocated the use of thymus extract in the treatment of these diseases. At that time he stated that this substance is not specific. The fact never-

theless remains that thymus seems to have a very definite beneficial effect upon the nutrition, and Nathan still finds that in those cases in which the joints are not destroyed or ankylosed (providing it is long continued and the routine dieting and mechanical treatment which are so harmful are omitted), it nearly always leads to more or less complete recovery.

When the mechanical functions of the joints are impaired the problem becomes a mechanical one, depending upon the mechanical conditions not only in each case, but in each joint.

POSTOPERATIVE PARALYTIC ILEUS.

FOWLER in *Colorado Medicine* for May, 1917, states that the treatment for postoperative gas should be instituted early, including enemas, hot stupes to the belly, eserine 1/100 to 1/50 grain, and pituitrin 1 Cc. each hour for three or four hours, unless it has a bad effect upon the heart. Goth recommends physostigmine salicylate 1/64 to 1/32 of a grain, digalen 15 minims each three hours, strychnine grain 1/30 to 1/15 each three hours, and caffeine sodium benzoate grains 2 each three hours, these last three alternating one each hour to support the heart. Cathartics are useless and perhaps damaging. Gastric lavage hourly or every two or three hours is indicated, but the best of all is large quantities of water both by bowel and by hypodermoclysis, ten to sixteen pints each twenty-four hours. Bonney suggests adding one ounce of brandy to each quart of saline infusion.

If the above medical measures fail to give relief within twelve to eighteen hours after instituting them, or if the patient gets worse in the meantime, then resort must be had to surgery without further "ifs" and "ands" of a continued waiting policy. The paralyzed gut must be drained at once to save the patient; and when one knows that this operation was successfully done in 1787 by Renault following the suggestion of Louis in 1757, and was later revived by Nélaton in 1840, we should not hesitate to

undertake it for the want of sufficient precedent or for the lack of the stamp of age-upon it.

As to the method of surgical attack we have the choice of several procedures that have been done and advocated by various surgeons. One may, as suggested and used by Thompson, perform an anastomosis between any loop of dilated gut that one happens to pick up and the ileum just before the entrance to the cecum, or this combined with an appendicostomy or a cecostomy; altogether, Fowler thinks, entirely too large an operation to be satisfactorily used in these desperate cases. One may also do an anastomosis between any portion of the dilated gut and any portion of the large intestine, preferably, he thinks, the sigmoid. If the cecum is dilated along with the small intestine, then one may do a cecostomy, as used by Victor Bonney, but Fowler believes that by far the best procedure to undertake is the easiest and simplest of all, and will be more likely to get the patient over the present dangerous condition, and that is to simply bring a loop of dilated gut to the skin, endeavoring to get a loop as high as possible, for it is important to get drainage as near the duodenum as one can, for this has been aptly called by Bonney "the reservoir of toxicity." This measure is upheld by McKenna, Whipple, Bernheim, Stone, and others. After the gut is brought to the surface and opened immediately after suture to the peritoneum, a tube is passed into the gut in both directions for drainage of both gas and fluids and also to irrigate the intestine with salt solution. McKenna says this operation should always be done under local anesthesia. Bonney reports one hundred per cent of recoveries in his five cases, and asserts that no patient with fecal vomiting should be allowed to die for the want of this operation. "Its effect in my cases," he says, "has been remarkable; in all of them there has been an immediate cessation of the vomiting, and all the patients have recovered."

This, of course, requires a later operation within a few weeks to correct the

fistula. The people may criticize us on account of this later operation, but when one considers that a live candidate for a second operation is of so much more value than a patient dead for the want of a fistula of the jejunum, one will have little hesitancy in urging such an operation in these extremely serious cases. Hicks claims that all one needs to do is to stir up the intestines in these cases and to wash out the peritoneal cavity.

The incision should be made upon the left side of the belly, as here you are more likely to pick up the jejunum within a reasonable distance from the duodenum so that the "reservoir of toxicity" may be better drained.

Recovery of the tone of the intestine comes on quite suddenly, within a few to several hours after operation, and in two of Fowler's cases treated medically tone was regained completely in the course of several hours after recovery really began.

Fowler concludes as follows:

1. The diagnosis can only be made exactly with the x-ray, and its aid should be invoked in every case of suspected dilated stomach or intestinal paresis.

2. Operation must be done early to obtain the best results in this very serious complication.

3. The simplest, easiest, and quickest operation should be done, and it must be done under local anesthesia.

4. The vomiting (gulping) and the pulse are the best guides to follow as to when to operate. The patient's statements, that he feels fine, etc., are misleading.

INTRAVENOUS GLUCOSE INJECTIONS IN INFANCY.

DUNN, in the *American Journal of Diseases of Children* for July, 1917, from certain experiences and experiments believes such injections may prove very useful. He points out that the principal difficulty attending intravenous injections and transfusion in young infants has always been a technical one, due to the extremely small size of the veins. The suggestion of

Helmholtz, that in hemorrhagic disease of the new-born transfusion could be more easily performed by using the longitudinal sinus, appears to be of the greatest importance in this connection. The longitudinal sinus in the infant is a large vein easily accessible through the open fontanelle. If the employment of this route in performing transfusion avoids the principal technical difficulty, it is available not only for transfusion in hemorrhagic disease of the new-born, but also for the giving of intravenous injections and medication. That certain forms of medication, as well as the giving of fluid for the purpose of stimulation or of supplying loss to the blood, are best given directly into the blood itself, rather than by mouth or by the subcutaneous route, has long been recognized. This is particularly true when it is desired to give a normal salt solution, or circulatory stimulants, in certain infants in whom the condition is such that absorption from the skin takes place with great difficulty. Such a condition is seen in many cases of extreme atrophy and inanition.

Dunn has adopted the use of the longitudinal sinus for obtaining blood for the Wassermann reaction and for giving intravenous injections. The technique has proved to be extremely simple and apparently entirely free from danger, except perhaps when salvarsan is used. He has used the longitudinal sinus for the giving of normal salt solution, of sodium bicarbonate in acidosis, of antitoxin in diphtheria, of circulatory stimulant drugs, and of solutions of glucose. It is the glucose injections which are considered in this paper.

The cases in which the intravenous injection of glucose was used were all of approximately the same type. They were cases of a condition well known to all pediatricists, showing extreme atrophy and inanition produced by various forms of gastrointestinal disease. Such cases are commonly admitted to the hospital in a moribund condition, especially in the summer and autumn months. Other cases are in less immediate serious condition when

first admitted, but go down-hill rapidly in spite of all available therapeutic resources. In the treatment of these cases, in addition to the regular dietetic treatment of the underlying gastrointestinal disability, Dunn has such measures as the checking of excessive watery diarrhea with loss of salts by means of opium, the counteracting of a relative acidosis by the giving of sodium bicarbonate, and the giving of fluid by rectum or subcutaneously to supply loss and as a circulatory stimulant. All the cases reported in the present series were of infants who were either admitted to the hospital in an acutely moribund condition, or who after admission became steadily worse under all the ordinary methods of treatment.

The theoretical basis for the use of intravenous glucose injections in such cases is that apparently the vicious circle produced by gastrointestinal disorder has become so extreme that the digestion and absorption of sufficient food to furnish the energy requirement of the body is impossible. Necropsies in such cases seldom reveal lesions of a character sufficiently pronounced to be considered the cause of death. We can hardly assume that death is produced either by lack of fuel or by the accumulation of the toxic products of a metabolism disordered by the lack of fuel. Glucose is the only food substance which exists outside the body in the same form in which it circulates in the blood and is utilized by the tissues. All other food substances must go through the complicated processes of digestion and alimentary absorption before they can be used. Consequently, it seemed that the injection of glucose directly into the blood in these cases might, through a temporary supply of even a small quantity of fuel, break the vicious circle for a length of time sufficient to permit improvement of the condition to take place.

The technique which he used is very simple. A syringe sufficiently large to hold the entire quantity of fluid to be given is connected with the needle by means of flexible rubber tubing. There is a glass

window in the tubing just above the needle. The needle is of small size, such as is used for lumbar punctures in infants, slightly larger than an antitoxin needle. The entire apparatus is sterilized, and the syringe is filled with a sterile 5-per-cent glucose solution. After expulsion of any air which may be in the tube, the needle is entered at the posterior angle of the fontanelle. Three persons are required to give the injection: one to steady the infant's head, one to manipulate the needle, and one to manage the syringe. The entrance of the needle into the sinus is accompanied by a sudden lessening of resistance. The piston of the syringe is then slightly and slowly withdrawn until blood appears at the glass window. As soon as the appearance of blood shows that the needle is actually in the sinus, the movement is reversed and the glucose injected very slowly, the assistant holding the needle firmly in place. Dunn has adopted the use of a syringe rather than the use of the gravity method, because with the syringe and glass window one can make sure that the injection is actually going into the sinus. He has found no objection to the use of the syringe if the injection is given very slowly. A sign of too rapid injection of the fluid is distention of the superficial veins of the scalp. No accidents or unfavorable effects which could in any way be attributed to the intravenous injections have been observed with glucose solutions.

In determining the quantity of glucose to be injected, Dunn rather arbitrarily adopted a 5-per-cent solution. He is inclined to think, however, that he will try somewhat stronger solutions in the future. The quantity of the solution to be injected depends on the quantity of fluid which it is safe to inject into the infant's circulation. This, of course, is not definitely known, and Dunn was obliged to adopt arbitrary rule. He began with a quantity of fluid approximately equal to one-fourth of the estimated blood volume of the infant. As this quantity of fluid appeared to produce no bad results of any kind, it was adopted as the standard for intravenous injections.

The blood volume is estimated at approximately one-fifteenth of the body weight, and therefore in choosing the quantity of glucose solution for intravenous administration to a baby, one-sixtieth of the body weight is taken. The quantity of glucose given, therefore, varies with the body weight of the infant. With 5-per-cent solutions, it lies between 1 gm. as a minimum, which would be contained in 22 Cc. of fluid, and would be suitable for a baby weighing 1320 gm., and 12 gm. of glucose, which would be contained in 240 Cc. of fluid, and would be suitable for a baby weighing 14,400 gm.

In eighteen cases the records are sufficiently complete to make them available for the purpose of this report. Dunn does not wish to imply, however, that these cases are presented in statistical form as proof of benefit from the injections. Clinical evidence of improvement with any therapeutic procedure of this kind is very uncertain and can never be accepted as proof. Nevertheless in some of the cases the improvement which followed the injections was so immediate and so striking that it seems to him that there is a possibility at least that the injections produced a good effect. It must be remembered that all the cases were either actually moribund or were of a type in which all other measures had failed, and in which a fatal ending seemed imminent. Of the eighteen cases in which this treatment was used, thirteen died and five recovered. After the injections, seven cases showed no improvement, five cases showed a slight temporary improvement, and six cases showed a striking improvement immediately following the injections. There is no evidence that the improvement, even if it was due to the intravenous injection, was caused by the glucose. The giving of fluid into the circulation in cases of this character is a therapeutic procedure of known value, and it is quite possible that the apparent improvement was due to the fluid given and not to the glucose.

Dunn has not on record a sufficient number of control cases in which normal saline

solution was given intravenously instead of glucose to present any evidence on this point. Even if he had such a series of control cases, the evidence would not be of much value in pointing to the glucose as the cause of improvement. There is, however, sufficient possibility of the improvement being due to this therapeutic procedure to warrant its further trial.

[If this plan is tried great care should be taken that the water used is not only sterile but freshly distilled, in order to avoid the so-called "water reaction."—ED.]

THE VALUE OF THE VON PIRQUET TEST AS CONTROLLED BY NECROPSY FINDINGS.

In the *American Journal of Diseases of Children* for July, 1917, KNOX makes a report on this subject. He says, as a result of his studies, that it may be concluded that the cutaneous test with tuberculin, as described by von Pirquet, is a most reliable aid in the detection of tuberculosis in children; that a positive reaction indicates invariably a tuberculous focus in the body; and that a persistently negative reaction establishes the fact that there is no tuberculous lesion except in those extremely ill patients in whom the presence of tuberculosis can be readily established by physical examination.

TREATMENT OF DISEASED NASAL SINUSES BY THE GENERAL PRACTITIONER.

FERGUSON in the *New York Medical Journal* of May 26, 1917, first reminds us that the ethmoidal labyrinth is made up of a series of delicate cells placed between the middle turbinate and the inner wall of the orbit, and extends anteriorly from the nasal process of the superior maxillary backward to the sphenoid body. The anterior cells drain into the middle meatus, the posterior cells into the nasopharynx.

The frontal sinus, really a high ethmoid cell, the outer wall of which forms the

prominent supraorbital ridge, extends for a variable distance upward in the frontal bone and outward and backward over the roof of the orbit. Being divided by incomplete septa, it drains by a very small duct downward and backward under cover of the middle turbinate. The maxillary sinus or antrum of Highmore is placed in the body of the superior maxilla, and drains in an upward direction under cover of the middle turbinate and near the opening of the middle ethmoidal cells, so it can be readily understood that this sinus really is a receptacle for the overflow from the frontal and ethmoidal cells.

The sphenoidal sinus is of similar anatomical construction in that it is a single cell in the body of the sphenoid bone and also drains upward. It is placed opposite the posterior edge or face of the middle turbinate, and is another receptacle.

On examining the nose with reflected light nothing of these natural sinus openings is seen; only the middle turbinate bone curving downward, outward, and backward, like a small sail, is observed, completely obstructing the view. Therefore it can readily be understood that when infection of the ethmoid cells exists the resultant swelling simply blocks the exits of these sinuses and intense pain from retention results.

In acute ethmoiditis the patient may at first complain of a sensation of stuffiness or cold in the head, due to the catarrhal swelling of the middle turbinate. This produces negative pressure in the sinuses and excessive secretion from their lining membrane, creating a suitable soil for infectious germs. As soon as the disease is established the patient complains of intense frontal headache, a distinct feeling of block high up in the nose, dizziness on bending down, tenderness over the inner wall of the orbit and frontal bone, general malaise, chilliness, and some rise of temperature. The discharge is thick and creamy in character and, if the nasal spaces are fairly free, will be quite profuse; but if the nasal septum is deformed, most of the discharge

tends to the nasopharynx and the frontal pain will be very distressing.

What is to be done? Rest in bed, an initial dose of calomel followed by salines, and a light diet are indicated. Locally a spray of cocaine hydrochloride, two per cent, in a solution of adrenalin 1 to 10,000, should be used. This is used frequently throughout the day, followed by a spray of albolene until the acute symptoms have subsided. Where there is a severe blocking and the cocaine spray does not give relief, one may try some steam inhalations which will help to unload the engorged tissues and promote the flow. When the acute symptoms have subsided a twenty-per-cent solution of argyrol followed by a spray of medicated oil may be employed.

An acute ethmoiditis may be confined to the ethmoids or involve the frontal sinuses. In any case the maxillary antrum and sphenoid act as receptacles and invariably contain pus. However bad the picture may look, it is a comforting fact that the great majority of first attacks clear up very well under conservative treatment. The great danger is in neglected cases, and there are many who receive little or no treatment. These drift into a chronic state and are in constant danger from the possibility of aural infection, chronic laryngeal catarrhal inflammation, general systemic infections, and cerebral abscess.

Subacute and chronic cases are surgical propositions and belong to the rhinologist. In any patient who has gone through an attack of acute ethmoiditis and exhibits nasal deformities, such as septal deflections and spurs—predisposing factors to catarrhal sinuses—Ferguson would strongly recommend the removal of these by the submucous method, thereby possibly guarding the patient against future attacks, or at least securing such free drainage that, should an attack supervene, he is saved the intense pain and possible intracranial complications as well as the severe and radical ethmoid operation.

Although Ferguson has spoken of the sphenoid and antrum of Highmore as re-

ceptacles, he does not wish to convey the idea that they never become infected independently. The antrum may become infected through a tooth socket, and the sphenoid may, as the result of repeated nasal catarrh, have its resistance so reduced as to fall an easy prey to infection, endangering the optic nerve as it passes over the roof of the sinus, or the more serious complication of thrombus of the adjacent cavernous sinus.

One frequently is consulted for an annoying headache, the source of which seems baffling. In these cases a careful inspection of the nose may reveal a middle turbinate pressing tightly against the septum. The application of a little weak cocaine solution in adrenalin to the point of contact may clear up the headache and indicate the necessary steps for permanent relief; or, again, there may be nothing to indicate either block or pressure, but the anterior tip of the middle turbinate may have a granular or moth-eaten appearance. Here one is dealing with a latent ethmoid infection which, owing to the free drainage in the middle meatus, gives the patient no concern except at such times as he contracts an acute rhinitis, which stirs up the latent ethmoid, and he complains of a dull headache and troublesome nasal discharge. In these cases vaccines have been used with variable results; sufficient successes have been recorded to warrant a trial by people averse to operation.

TWO CASES OF SUDDEN DEATH AFTER KHARSIVAN INJECTION.

VASSALLO (*Practitioner*, March, 1917) notes that kharsivan is identical in essential particulars with the corresponding products of German manufacture. He states that death, although it followed the injection, was not due to the kharsivan because it occurred so rapidly that there was absolutely no time for the kharsivan to be absorbed.

The children upon whom injection was practiced were black and had jaws. One

also suffered from crap-pox. Three-tenths of a gm. of kharsivan was administered to each boy, in the gluteal region. The injections were freshly prepared from separate tubes. The rest of the tubes were given to other patients, who never showed any ill effects. Each patient walked out of the surgery, and a few minutes later dropped to the ground in a state of collapse. The first case died within fifteen minutes of the injection; the other within seventeen. Post-mortem examinations revealed no pathological clue as to the sudden cause of death. The stomach and intestines, particularly the small gut, were enormously distended. The author ascribes the deaths to shock.

THE EFFECT OF CASTRATION ON OSTEOMALACIA IN THE MALE.

ELLIOTT and NADLER (*American Journal of the Medical Sciences*, May, 1917) rightly observe that the cause of osteomalacia is not known. The disease has been attributed to infection, errors of nutrition, and perverted glandular function. Organisms have been isolated from the blood of patients and of animals suffering with a similar condition. Organisms isolated from the blood of white rats have reproduced malacia after injection into other rats. Feeding experiments have suggested the relation of errors of nutrition. The theory of perverted glandular function has been most supported, and much work has been done in the attempt to fix the responsibility of the various ductless glands. The ovaries, hypophysis, adrenals, thyroid, and parathyroids have been thought to play a rôle, singly or as a part of a polyglandular syndrome.

The loss of calcium and the softening of bone, together with a new production of bone poor in lime, are characteristic. There is a tendency to lime deposit elsewhere, as in the kidneys and bladder. McCrudden believes that osteomalacia is an exaggeration of a normal function, that the balance of bone metabolism is disturbed by excessive demands for calcium, as in pregnancies, bone tumors, and fractures. When

bone catabolism exceeds anabolism the result is osteomalacia.

Treatment is empirical. Phosphorus, adrenalin, pituitrin, thyroid extract, arsenic, chloral, and chloroform narcosis have been among the remedies advocated. Since Fehling, in 1887, recommended castration in the treatment of osteomalacia in women, authors have reported as high as 80 per cent of cures following operation. Sterilization by Roentgen rays has proved beneficial. Results were best in puerperal cases, which often tended to recover spontaneously; nulliparæ were usually not benefited. Metabolic studies do not indicate that a mineral retention is produced after castration, as was supposed. Accordingly, many authors believe that the value of castration and sterilization lies only in the prevention of future pregnancies. Although castration of male cases has been advised in the hope of producing results comparable with those reported in female cases, no report of the operation has been found in the literature.

Five years after castration the case reported in this paper shows no actual improvement in bone structure. A probable remission has occurred, which may have been influenced by the operation. The result of castration in this patient would seem to indicate that osteomalacia is not a disease of the sexual glands.

THE END-RESULTS OF TREATMENT OF FRACTURE OF THE ELBOW.

NEUHOF and WOLF (*Boston Medical and Surgical Journal*, May 31, 1917) find a perfect end-result is one in which the normal range of motion is a sequel of the treatment of a fracture of the elbow. Anything short of this is termed an imperfect result. Of 13 cases treated by hyperflexion early mobilization and massage gave perfect results with moderate or marked displacement in 93.2 per cent; perfect results with slight to no displacement in 10 cases, 100 per cent. Thorough immobilization and massage without hyperflexion gave a perfect result, with moderate or marked

displacement, in 4 out of 10 cases; a perfect result with slight or no displacement in 12 out of 22 cases. Late mobilization and massage and without hyperflexion gave perfect results with moderate to marked displacement in one out of eight cases; perfect results with slight to no displacement in four out of thirteen cases.

Thus the clinical evidence is strongly in favor of treatment by reduction, hyperflexion, early mobilization, and massage.

SUPRAPUBIC CYSTOTOMY UNDER LOCAL ANESTHESIA.

BARNETT (*Urologic and Cutaneous Review*, April, 1917) states that he knows of no operation which will give so much in return as local anesthesia in suprapubic cystotomy when indicated.

Suprapubic drainage of the bladder is superior to urethral drainage if for no other reason than the fact that retention is practically impossible following suprapubic cystotomy, and the relation of danger between retention and non-retention is the relation between clean kidney pelves and renal tubuli, compared to infected ones on account of the distention carrying the infected urine up the ureters into the tubular portion of the kidneys.

Urethral drainage is unsatisfactory at best. The urethral catheter has laws of its own. No man knows after fixing the catheter in the bladder whether it will drain for two minutes or two weeks. There is no logic in its workings, and all laws of physics seem to be broken by the catheter's refusal to drain. One retention at this time will undo all the good that weeks of preparation have accomplished.

Urethral drainage will aggravate carcinomatous prostates so that a retention catheter is badly borne. Cancer occurs according to the most liberal estimate once in a little more than six cases; on the other hand the claim is made for its occurrence once in every four cases. The author's last ten prostatectomies showed, unfortunately for him, seven carcinomas. Suprapubic cystotomy under these circumstances

would become a necessity, if not from choice.

Urethral drainage will predispose to epididymitis by pumping infection into the vasa through the utriculus masculinus (sinus pocularis) by way of the ejaculatory ducts.

The extra pus absorbed by the catheter trauma is shown frequently by the continued alkalinity of the urine. However, if this absorption is not too great it may be beneficial in helping to immunize the patient.

Hospital confinement seems to alkalinize urine. The writer's treatment after cystotomy is to send the patient home to his attending physician for preparatory treatment. Under home surroundings the renal function seems to improve more rapidly, and it is the rule to have the persistent alkalinity disappear.

The author's technique consists of one-per-cent cocaine solution injected subdermally in the linea alba or mesial line; after the skin anesthesia is finished, without removing the needle, the mesial line of the belly is injected (superficial, middle, and deep) with the one-per-cent cocaine solution, then the perimesial with 1:400 solution of novocaine. A one and one-half inch incision is made through the skin, between recti and pyramidales, then intraversalis fascia (assistant now fills bladder with saturated boric solution till it is rushing upon operator's finger). One-per-cent cocaine solution is injected into the bladder wall around site for puncture; now with slightly blunt scissors the perivesical fascia is opened, peritoneum pushed back, bladder wall pushed open with point of scissors to mucosa, then trocar and cannula plunged into bladder, trocar being removed to above drainage outlet of cannula. After the saturated boric acid solution has partly emptied, trocar is completely removed; Pezzer catheter on stilet and oiled is introduced into the bladder, after which the cannula is removed; a small cigarette drain is introduced in front and behind catheter down to bladder wall. No sutures are required; catheter is pulled

up till it is felt against the bladder wall. No leakage should occur around the catheter. The Pezzer catheter should be replaced by an ordinary catheter after seven days if phosphatic incrustations are felt on introducing the stilet.

SURGERY OF THE SPLEEN.

CALDWELL (*Southern Practitioner*, June, 1917) is inclined to class the splenomegalies as low-grade infections or toxemias. The finding of a pathological organism is quoted.

Surgery has been employed in the treatment of splenic enlargement from all causes, except the acute diseases associated with enlarged spleens, such as typhoid and typhus fever. Even hypertrophy, believed to be due to such diseases as malaria and syphilis, has, in a small number of cases, shown marked improvement after splenectomy, when medical measures failed to bring relief. It is for splenic hypertrophies that removal of the spleen is being employed most. Of course, tuberculosis, abscess, new growths, and injuries to the spleen have a definite foundation and indication for surgery. But the removal of the spleen for splenic anemia, hemolytic jaundice, the hypertrophic cirrhosis of Hanot, is employed because cures have been attained without knowing any reason for the satisfactory results. Splenic anemia is cured, or very greatly benefited, by the removal of the spleen, even in the rather late stages of the disease. The results obtained in hemolytic jaundice and Hanot's cirrhosis are not quite so satisfactory, but the results are such as to make the indication for surgery quite clear, in these conditions.

In the last few years splenectomy has been employed in an effort to at least control, if not cure, that dread disease, pernicious anemia. The early results obtained from splenectomy in these cases gave promise of great improvement in the treatment of pernicious anemia. However, the late results have been just as discouraging

as the early ones were encouraging. It is remarkable how definite and uniform improvement is obtained in these cases after removal of the spleen. Seventy-five to ninety per cent of the cases surviving operation show immediate improvement in the clinical course, the blood picture maintaining many of the characteristics of pernicious anemia. While we recognize that the ordinary course of the disease is very bizarre, yet no other method of treatment has given such uniform improvement: hence we must attribute some definite influence to the surgery. Possibly, when we are able to properly select our cases of splenic anemia to be subjected to surgery, and also when we can supply surgery in an earlier stage, we may hope for more lasting improvement.

Mayo has observed that the cases of pernicious anemia, associated with definite splenic enlargement, derive the greatest benefit from splenectomy. The yellow type of pernicious anemia is suggestive of marked destruction of blood cells; the white, aplastic bone-marrow, which indicates different etiological factors, or at least involving different structures. This accounts for the greater improvement in the former type, which is associated with enlarged spleens. However, as the line of demarcation is so indefinite between the yellow type of pernicious anemia and acquired hemolytic jaundice, one may be easily mistaken in diagnosis, and the improvement be noted in the yellow type, because it was hemolytic jaundice and not true pernicious anemia.

As the boundary line between all the above-mentioned diseases, as well as certain forms of Hodgkin's disease, is so indefinite, any conclusions at which we might arrive must, of necessity, be indefinite. Banti himself acknowledged that splenic anemia, or Banti's disease, might be Hodgkin's disease of the spleen.

The author thinks that Krumbhaar sums up in a very concise and clear manner the indications for splenectomy in pernicious anemia in the following paragraph:

"In what cases of pernicious anemia

should splenectomy be undertaken? One of two lines may be followed, and it is as yet too early to say which, if either, is correct. If splenectomy merely induces a remission, and this at present is the opinion of the majority of observers, it should be logical to undertake it only as a last resort, when all other measures have proved unavailing, and only with the hope of prolonging life; even under such limitations, however, the procedure has already proved its value, and in several cases moribund patients have been brought back to life of comparative well-being for many months. Assuming, on the other hand, that an occasional patient may be, for practical purposes, cured of the disease, and giving due weight to the view that greater and longer continued improvement is obtained, if the operation is performed before the disease has reached its final stage, it would then be advisable to undertake it as soon as possible. Another factor that may prove to be decisive is whether or not increased hemolysis can be proved. In those cases with clinically enlarged spleens, icteroid appearance and increased urobilin output without increased resistance of the erythrocytes, the prognosis is distinctly more favorable than in the opposite types. The condition of the bone-marrow is also important, splenectomy being contraindicated if the bone-marrow is persistently aplastic. It has also been a matter of clinical observation that those individuals in whom spinal cord symptoms had already developed are less apt to be helped by the operation."

In a final report on fifteen cases operated at the Massachusetts General Hospital, only one was alive sixteen months after operation, and was in a serious relapse at this time.

W. J. Mayo takes a more optimistic view, while he gives no definite figures. He says: "But from our experience with nineteen patients, I feel justified in performing splenectomy in selected cases of pernicious anemia, and have at least the hope that, if it is done sufficiently early in the course of the disease, it will permanently check, if not cure, the condition." The only sug-

gestion in the above as to what constitutes "selected cases" is the early cases.

Theoretically, at least, any measure that produces the immediate definite improvement that splenectomy does should have some real value. However, the value may be so meager that it is more than overbalanced by the mortality incident to the operation, which of necessity must be high, as any other major operation would be applied to such poor risks. In the reported cases that the writer has observed the low mortality is indeed surprising, not being any higher than splenectomy for any other condition. The mortality of splenectomy varies anywhere from 11 per cent (Mayo clinic), the lowest for any considerable number of cases, to 50 per cent.

WHOLE-SKIN GRAFTS AND CONTRACTURES.

DAVIS (*Surgery, Gynecology and Obstetrics*, July, 1917) notes that pedunculated flaps are especially valuable when fat is required in addition to the whole thickness of the skin. He holds that the graft of the whole thickness of the skin furnishes a most satisfactory solution of the whole graft problem.

The technique is as follows: If possible the part should be thoroughly massaged for some time before operation, as in this way the surrounding tissues are made more movable; the blood supply is improved, and better results are accomplished. All of the scar tissue should be excised if this can be done with safety, but in many instances the entire part is covered with scar, and in these only the contracture should be entirely excised, while the movable scar tissue beyond should be utilized. In contractures of the hand the author has found it best at this stage to apply a splint, previously prepared and sterilized. The splint should be padded with thick felt, and be so arranged that the fingers can be held in the desired degree of extension, either by loops of tape or by cotton glove fingers.

It is of the utmost importance that the raw surface on which the graft is placed be

perfectly dry. It is often difficult to check the oozing, and in some instances in which the bleeding cannot be stopped it is advisable to wait for a day or two before applying the graft. If the graft is placed on an oozing wound, the chances are that a blood-clot will form beneath it, and this will often seriously interfere with its new blood supply. If the graft is placed on a dry surface, it has the tendency to prevent further oozing, and if any bleeding should subsequently begin, it is usually localized in a comparatively small area, and can escape through the perforations in the graft or between the stitches.

Whole-thickness grafts may also be successfully placed on undisturbed, healthy granulations which are level with the skin edges. The grafts should be placed close to the growing edge, and to each other, if more than one is used. Whole-thickness grafts placed on dry granulations will adhere to them closely, and no sutures may be necessary. Grafts placed on granulations at first project above the surrounding skin, but later assume the proper level.

Shave the part selected, and wash with green soap and water. Rinse with sterile water. Sponge with ether followed by alcohol. Then rinse with normal salt solution, and dry with a sterile towel. From this point preserve an absolutely dry technique until the graft is in place.

Mark out lightly with a scalpel on the skin an elongated ellipse, bearing in mind that the edges of the wound caused by removal of the graft should be approximated with but little tension. Remove the skin with the underlying fat, down to the fascia or aponeurosis covering the muscle. As soon as the scalpel has penetrated the subcutaneous fat the skin immediately shrinks about two-thirds of its original size transversely, and a little less in its length, and this shrinkage must be planned for.

Wrap the graft in dry gauze until the wound from which it is taken is sutured and dressed. Then trim off all the fat from the graft with curved scissors. Perforate the graft in several places to allow the escape of any blood or secretions which

may collect. Fit the graft into the defect, either in one piece or in several pieces, depending on the shape of the wound. If one piece can be used, it is advisable to secure it without tension by four cardinal sutures, preferably of horsehair. In some instances a continuous horsehair suture is used to fill in between the cardinal sutures, and in others a few interrupted sutures. The cardinal sutures should be through the full thickness of the graft, but the sutures between should be superficially placed, and should be as close to the edges of the graft and surrounding skin as possible. Occasionally no sutures at all are used as the graft adheres closely to the dry wound, but where no sutures are used it is advisable to secure the graft by means of rubberized mesh. A slight, even pressure should be exerted on the graft to hold it firmly against its base, but too much pressure should be avoided, as it interferes with the vitality of the graft.

The graft should be handled as little as possible, and the necessary handling should be most gentle. All of these points seem trivial, but on them depends the success or failure of this type of graft. A Thiersch graft may be handled with much less consideration and be successfully transplanted.

It is often advised in text-books to excise the scar tissue in one piece, and after excision to place it as a pattern on the skin and cut the graft by it, but this is not entirely practical, as the majority of scars are irregular in outline, and furthermore the scar itself shrinks after excision, and the graft after cutting shrinks; so little can be gained by this procedure. The author considers it essential that the wound from which the graft is taken should be closed at once and not left open, as would necessarily follow if an irregular-shaped piece of skin of any considerable size were removed. It is advisable to have the size and shape of the defect in mind when cutting the graft, but it will be found that a piece of whole-thickness skin after removal of the fat is very pliable, and can be easily fitted into irregular defects. It is better to have the graft too large than too small, and if the

defect is irregular, the graft may after removal be cut into the desired shape, or divided and pieced together. It is, of course, desirable to fill a defect with a single piece of skin, as there are fewer resulting scars, but this is often impossible.

Silver foil, dry gauze, moist salt gauze which is kept wet or which is allowed to dry out, are all excellent dressings. Another dressing which the author has found useful is a flexible paraffin mixture used by Carrel for another purpose. Any of these may be used with success, but none of them should be used exclusively, as the dressing should be chosen with regard to the surroundings of the wound grafted. For instance, it is more satisfactory to dress a graft used around the eye with moist salt gauze which is kept wet and often changed; as by this means the secretions from the eye are controlled, and there is less danger of infection, etc.

In children under ten years of age, in addition to the splint in hand and arm contractures, the author finds that it is always wise to put up the part in a plaster cast. If there are no contraindications, he does not disturb this cast for at least three weeks, and at the end of this period it will be found that either the graft has taken, or, in case of failure, the process of healing has proceeded with the part in good position. So in either case no time is lost. Another reason for keeping the cast on so long is that it is almost impossible to keep the part in the original position after once removing the dressing. This method of dressing children also insures immobilization, which is most important.

Except in young children, in whom plaster casts are indicated, it is well to keep the grafted area under constant observation, without disturbing the position of the part, which should be kept immobile until the blood supply is assured.

A general anesthetic is usually necessary in order to remove the contracture, and to prepare the wound for the graft. Advantage is always taken of this anesthetic to cut the graft, but whole-thickness grafts may easily be secured and successfully transplanted

after nerve-blocking, or after outlining the area with a local anesthetic.

In whole-thickness grafts there may be practically no maceration of the superficial layers, while in some instances, on the other hand, only the corium may remain viable. Now and then an isolated section of a graft will lose its vitality through all its layers, and a patch of granulation tissue will appear. This area should be treated as any other granulating wound.

When the superficial layers are macerated and come away, either as a whole or in part, and the epithelization of the remaining corium is sluggish, it is desirable to scatter over these areas either epithelial scrapings or small superficial grafts including as far as possible only epithelium. These grafts take readily, and hasten the epithelization. The final result is excellent.

The result desired in whole-thickness grafting is elasticity, softness, movability, and normal color. Krause says that all of these are obtained in a third of full takes. In some instances a brown, irregular pigmentation may appear, but this is no more frequent than in areas grafted with thin grafts, so need not be particularly considered in cases of contracture in which function is more important than appearance. The graft may be cyanotic for some time, due to enlarged blood-vessels; later the surface of a graft may become irregularly shriveled. These changes in no way impair the efficacy of the graft, but must be borne in mind from the cosmetic standpoint and the possibility of these complications explained to the patient.

The histological changes in the healing process of a whole-thickness graft are, in general, similar to those which take place in healing of an ordinary clean wound. There is an exudation of fibrin from the surface upon which the graft is placed, which fixes the graft firmly in position. This fibrin layer is infiltrated by leucocytes and fibroblasts, and vascular sprouts soon begin to form and penetrate the corium, so that in a comparatively short time the graft is supplied with blood. These new vessels have been demonstrated by the injection

method in whole-thickness grafts on the third day. As early as the sixth day a whole-thickness graft on a fresh wound will bleed when cut. The author has obtained bleeding in eighty-four hours from a whole-thickness graft placed on healthy undisturbed granulations. The graft itself begins to take an active part in the healing process after the third or fourth day, there being marked proliferation of cells into the underlying exudation, and an outgrowth of new epithelial cells from the edges, from the ducts of the sweat glands, and from hair follicles. The elastic tissue of the graft degenerates and is replaced by newly formed tissue which probably develops, at least in part, from the preëxisting elements in the graft itself, as well as from the old fibers in the neighboring deeper tissues. A thin layer of adipose tissue develops under whole-thickness grafts denuded of fat in two to three weeks. This is most important, as it prevents to a large extent contracture and insures movability. The scar tissue beneath the graft continues to grow for several months. The newly grafted area must not be exposed too soon to irritation or trauma. It is difficult to guard against this until the nerve supply is reëstablished, as for the first few weeks the graft is without sensation. Within four or five weeks sensation begins to be restored to the transplanted skin, which gains tactile sensibility first, then pain, and last temperature sense. The nerve fibers undoubtedly grow in from the periphery, and not from the substratum, this being shown by the border sections always regaining sensation first. If the graft is large the central portion may, in some cases, remain less sensitive for a long time, but usually the sensation is entirely restored in the course of a few months.

In those cases of contracture in which the eyebrow has been destroyed, carefully shaped whole-thickness grafts of hairy skin from the pubis, with a thin layer of subcutaneous tissue, may be successfully transplanted, and will relieve the contracture, and at the same time form an eyebrow. In transplantation of skin from the pubis the

direction of the hair growth should be kept in mind. Hair also grows on grafts taken from the thigh, or from any other hairy region. For this reason it is important to choose carefully the region from which the graft is taken.

AMPUTATION FROM THE ARTIFICIAL LIMB POINT OF VIEW.

OPENSHAW (*Lancet*, June 16, 1917) points out that one finger or the thumb of the natural hand is more useful than any apparatus. If there be left only the thumb or one finger, artificial fingers or an artificial thumb can be fitted, so that the patient has something to which he can oppose the remaining digit.

Amputation of the wrist-joint should not be done if it is at all possible to leave any portion of the hand, for it gives too long a stump for the proper application of an artificial hand. It is necessary to put the artificial wrist-joint at the end of the natural wrist-joint, and this brings the hand too far away from the elbow, and muscle power is lost.

In patients engaged in clerical pursuits, a new wrist-joint should be made by removal of one and a half inches of the radius and ulna, for to this an artificial hand can be fitted, so that the flexion and extension movements are converted into flexion of the interphalangeal joints of the index and middle fingers. The site for amputation of the forearm is one where the bones are divided at the lower end of the middle third of the forearm, for this gives a powerful useful stump, not too long, and capable of full pronation and supination.

A forearm stump where the ulna measures less than three and a half to four inches from the tip of the olecranon is often exceedingly difficult to fit with an artificial forearm bucket. The stump repeatedly slips out of the forearm bucket. As the supinator longus, the extensor muscles, and the flexors are useless, these should be removed in order to produce a flat surface upon which the upper and anterior edge of the forearm bucket can rest. If not more

than two inches of the ulna (measured from the tip of the olecranon) can be left, the amputation should be performed above the condyles of the humerus.

Amputation of the elbow-joint should never be performed as an operation of election, for it is difficult, though not impossible, to fit an artificial limb to an amputation ~~such an amputation, be performed the condyles must be removed, for if left it is impossible to accurately fit an arm-socket unless it be laced up the whole length of the front, which considerably weakens it.~~

The best site for amputation of the arm is one between a point one and a half inches above the elbow-joint on the one hand, and three inches below the fold of the axilla on the other, and an endeavor should always be made to divide the humerus between these two points.

With regard to the shoulder, it is easier to fit an artificial limb to an amputation where the head of the bone has been completely removed than it is to fit one to an amputation through the surgical neck of the humerus. It must be remembered that it is possible to fit an artificial limb to any amputation of the upper extremity.

At the shoulder-joint, by means of a molded leather cap, an artificial arm is adjusted to the body. Considerable space should be allowed between the arm and the chest wall by flattening the inner surface of the arm, so as to facilitate dressing. By adjustable straps and wires, the movements of the opposite shoulder can be utilized to bend the elbow of the artificial arm, and by a similar arrangement, passing round the chest and down the artificial arm to the thumb, the latter can be moved by abducting the opposite arm.

In amputations it is essential that the nerve trunks should be cut as short as possible and the ends of the stump should be covered with a loose movable non-adherent skin-flap.

With regard to the lower extremity, if the amputation has been of the digits and the bone is well covered with the scar on the dorsum, a boot can easily be fitted, and the patient walks well.

No skin-grafting of a granulating Chopart gives the least chance of a useful stump. The scar ultimately becomes the lowest part of the foot in consequence of the contraction of the tendo Achillis, and will not bear the weight of the body without ulceration.

Often a suppuration has followed a guilotine amputation performed through the center of the tarsus. A Syme is ultimately necessary, and should be resorted to early.

Neither a subastragaloid amputation nor a Pirogoff gives the most useful foot.

A Syme amputation is the best about the ankle-joint. It should be performed exactly as described by its originator, the malleoli and a layer of the tibia a quarter of an inch thick being removed. This gives room for a joint in the artificial foot itself instead of in the lateral steel supports. The amputation in the leg between the ankle-joint (Syme) and a point six inches below the top of the tibia must be looked upon as likely to give an unsatisfactory stump, and one which is, therefore, a tentative amputation. Such a method gives an unsatisfactory stump which is thinly covered, badly nourished, liable to blueness, anemia, ulceration, and sinus formation. It is only permissible as a temporary expedient.

The best amputation of the leg is one where the bone is cut four to five inches from the upper edge of the tibia, where the lower end of the tibia is square, and where it is well covered with healthy movable skin. A patient with such an amputation can carry a considerable part of the weight of his body on the end of the tibia, the remainder being borne by the lateral surface of the tibia and fibula and partly along the surface of the thigh.

After this amputation, with a well-fitting artificial limb, a patient can walk, run, and dance in such a way as to render it absolutely impossible, even for an expert, to decide which leg is artificial.

In this amputation the fibula ought to be cut half an inch shorter than the tibia, otherwise it seems to increase in length and to project. Should, however, the end of the tibia not be well covered with movable

skin the weight of the body cannot be borne on the end of the stump, and has to be carried on the lateral surface of the tibia and fibula, the sides of the thigh, and the tuber ischii.

It is imperative that in any amputation at the upper third of the leg the knee-joint should be kept straight, as flexion may render a further amputation necessary, either through the knee-joint or just above it. If the knee-joint is allowed to become flexed the hamstrings and the posterior ligament contract and shorten, and all these structures, even the posterior ligament, may require division; and even then it may be impossible to straighten the leg, and amputation at or above the knee-joint may be necessary.

Even one inch of the tibia, if well covered on the under surface, gives a more useful stump than an amputation through or above the knee-joint. The endeavor should always be made to divide the tibia in such a way and at such a point as to get a good covering for its cut surface. If this is not possible there will be a scar over the end of the tibia, and it is better to remove the tibia and the patella by some sort of incision similar to that for a Stephen Smith amputation.

In every Stephen Smith amputation the patella ought to be removed, for if left it retracts and forms a wobbling excrescence, which prevents the accurate fitting of a thigh bucket. It is quite easy to fit the leg after an amputation of the knee-joint.

A transcondylar amputation of the femur gives a very good stump. The periosteum should be pushed up and replaced over the edges of the divided bone. When the amputation is above the condyles, up to a point higher than the middle of the femur, the artificial leg should be made with a lacing bucket of leather, not wood. The tuber ischii should rest upon its upper edge, so that the patient's weight is transferred to the ground through the tuber ischii and partly through the friction of the skin against the inside of the bucket.

At or above the middle of the femur every amputation case should be fitted with

a pelvic band, which should be accurately molded to the body before the steel is hardened. It should extend from just below the anterior superior spine on the affected side round the body below the iliac crests to the opposite anterior superior iliac spine. The hip-joint in this pelvic band should be at a point opposite the center of the great trochanter and half an inch above it. Such a pelvic band prevents the wobbling of the thigh and considerably improves the patient's gait.

Amputations in the upper third of the thigh, where the bone is divided at any point between the small trochanter and two inches below it, give a stump well-nigh impossible to fit with an artificial limb. If more than two inches of bone below the small trochanter cannot be left, then the femur should be divided at the small trochanter or through the great trochanter. It is easier to fit an artificial limb where the bone has been exarticulated at the hip-joint than it is where the bone has been divided through the great trochanter or at the small trochanter, so that if a long thigh stump cannot be made there need be no hesitation in removing the upper end of the femur, provided, of course, that the condition of the wound as to sepsis and of the patient will allow of this rather more severe proceeding.

INFECTION OF SIMPLE CLOSED FRACTURES.

BLAKE (*Boston Medical and Surgical Journal*, May 3, 1917) notes that in the past twenty years at the Boston City Hospital there were ten or twelve cases of infection of simple closed fractures; by this is meant an infection which parallels both in intensity and duration the infection which is still too common in compound or open fractures. The etiological factor is the entrance of bacteria through the skin either by a scratch or a hair follicle, or by the gateway of blebs and blisters; rarely through the circulating blood. Treatment is primarily preventive. It means more than the usual care in the cleansing of the skin of blebs and blisters; the latter may at

times contraindicate the immediate correction of fractures. When suppuration is evident, incision and drainage and the usual routine of the septic compound fracture treatment is obviously to be followed.

Scudder reported in this relation a case entering the hospital with a T-fracture of the lower end of the femur. It was decided to do an open reduction, but on attempting this, pus and blood were evacuated from the swollen tissues about the joint and from the joint itself. The patient subsequently perished.

Blake, referring to cases which were found to be infected at the time of late operation or at autopsy without sinus infection before this time, notes that it is possible that some cases of delayed union are complicated by what might be called a "silent infection."

GASTROJEJUNOSTOMY UNDER LOCAL ANESTHESIA IN THE TWO-STAGE OPERATION IN GASTRIC SURGERY.

CHEEVER (*Boston Medical and Surgical Journal*, May 3, 1917) notes that whenever possible, in two-stage operations, one or the other is carried out under some form of local anesthesia. He believes that certain surgical lesions of the stomach, or indeed of other organs, associated with or complicated by pyloric obstruction, furnish an ideal field for the two-stage operation, the first stage consisting of relief of the obstruction by gastrojejunostomy under local infiltration anesthesia. The technique employed has been of the simplest character. Cases 1 and 2 received a preliminary injection of 1/150 grain of scopolamine and 1/6 grain of morphine, the latter repeated just before the operation was begun; the remaining cases received ¼ grain of morphine half an hour beforehand; sometimes 1/6 grain was given during the operation, if prolonged. Anesthesia was always by infiltration with novocaine solution, usually 1 per cent, in two cases 5 per cent. At two points in the operation pain may be expected: first, when retraction is made to

permit of inspection and palpation to determine the extent of the disease; second, when traction is made on the root of the transverse mesocolon preliminary to securing the loop of jejunum and to incising the mesocolon to enable the posterior surface of the stomach to be brought into the operative field.

The difficulty of satisfactory determination of the extent of the growth and of the presence of and extent of metastases constitutes the least satisfactory part of the operation, but is much obviated by careful infiltration of the parietal peritoneum about the wound. The actual performance of the anastomosis is painless, and the patient, exhausted by starvation and narcotized by morphine, sometimes falls asleep during it, to awake again when closure of the wound is begun, which is again aided by secondary infiltration of the peritoneum. The anastomosis is made by a vertical stoma, the posterior serous approximation by interrupted silk sutures, a posterior seromuscular continuous suture of No. 1 chromic gut, a second continuous suture of the same material approximating the mucous edge, and an anterior inverting Connell suture of No. 1 chromic gut, supported by interrupted mattress Lembert sutures of silk. In eight cases curved gastroenterostomy forceps were used; in two cases adhesions prevented their employment.

SPINAL ANESTHESIA.

YOUNT (*Surgery, Gynecology and Obstetrics*, July, 1917) on the basis of some 5000 cases, with but a single death, which occurred before spinal puncture and stovaine had been injected, notes that there are certain definite contraindications to spinal anesthesia which deserve careful consideration. Those based upon the physiological action of intraspinal anesthetics are most important.

As there is an almost constant drop in blood-pressure of varying degree, spinal anesthesia should not be used in cases in which there is marked hypotension from shock, hemorrhage, or any other cause.

Moderate hypotension need not be considered a contraindication except in operations on the upper abdomen or higher. Operations on the perineum, rectum, and lower extremities can be done safely even in the presence of marked hypotension, but special care is necessary in dosage and supportive measures. In exceptional cases in which spinal anesthesia would be considered the anesthetic of choice, in spite of the presence of marked hypotension operation could be safely done by giving continually, during the operation, normal saline containing adrenalin, intravenously. This procedure seems to combat successfully the usual drop in blood-pressure. The very old and asthenic individuals from long-continued illness seem to be unable to reestablish their blood-pressure after a moderate drop. As a rule they should not be chosen for spinal anesthesia, unless the operation is below the level of the pubis and a very small dose can be used.

Cases in which there is marked interference with free cardiac action should not be chosen—*e.g.*, pericarditis, advanced myocarditis, mediastinal tumors and large pleuritic effusions displacing the heart. These cases almost invariably do badly under spinal anesthesia.

When the respirations are shallow and slow and the diaphragm plays an important rôle, spinal anesthesia is contraindicated in any condition which interferes markedly with diaphragmatic breathing—*i.e.*, extensive ascites, large intra-abdominal tumors, large pleuritic effusions, etc. This does not apply to operations below the pubis. There is one important exception to this general statement. In paralytic ileus after the injection of stovaine, the intestines tend to contract and the relaxation of the anal sphincter allows them to empty themselves so that the interference to respiration is quickly removed. This, of course, would not hold in mechanical obstruction.

Cases in which there is existing cerebro-spinal disease should not be chosen unless there are other conditions present which render spinal anesthesia the anesthetic of choice.

It is dangerous to use spinal anesthesia when there is any likelihood of a convulsion occurring at the time of or shortly after injection—*i.e.*, eclampsia, tetanus, and hysteria. The author has observed one death which occurred in an eclamptic convulsion, in a woman who was given stovaine preparatory to doing Caesarian section. If spinal anesthesia is especially indicated in any of these conditions, as it probably always is in eclampsia, measures should be taken to avoid the occurrence of convulsions at the time of operation.

Although stovaine has been used in children quite extensively it has not been found very satisfactory. Considerable difficulty is usually encountered in trying to effect lumbar puncture, due to resistance on the part of the patient. This may result in undue trauma to the cauda equina. The percentage of failures is higher than in adults, and on a few occasions it has been necessary to give a general anesthetic even with perfect anesthesia on account of extreme restlessness and nervousness. It is probably better to confine the use of spinal anesthesia to the selective field in children.

Extremely nervous individuals and those who are prejudiced against the method had better be excluded.

Marked deformity of the spinal column is not necessarily a contraindication to spinal anesthesia. Of course, if the deformity is so marked that spinal puncture cannot be done, it cannot be used. In more than 2500 consecutive cases the author has not failed to effect puncture in a single case. If there is active disease of bone or the overlying soft parts spinal anesthesia should not be used.

In spinal anesthesia a very small dose of a toxic drug is used, and it is confined to a small area in its direct action. The action is temporary and there is no deleterious effect on structures remote from the area of injection. These points, in addition to its particular physiological action, peculiarly adapt it to use in certain conditions in which inhalation anesthesia is contraindicated. The latter is dangerous in these

conditions because it places the organism in a state of general toxicity, because of its irritative action on the lungs, and because of other less important physiological action peculiar to it. In a general way all operations below the level of the nipples can be done with a sufficient degree of success under spinal anesthesia to warrant its use in this selective field, but only in the hands of one with reasonable skill in the method. Facts bearing on physiological action should be the basis for selection in the majority of cases.

Patients in whom there is a very high blood-pressure, or in whom a slight rise in blood-pressure would be dangerous, or in whom it would be advantageous to lower the blood-pressure during operation, should be operated under spinal anesthesia. The majority of patients in this class would probably be those suffering from advanced arteriosclerosis or cardiorenal disease and aneurisms.

There is less impairment of renal function following operation under spinal anesthesia than with inhalation anesthesia. This fact has been definitely determined by a comparative study with the phenolphthalein functional renal test and by careful examination of catheterized specimens of urine before and after operation. This fact renders spinal anesthesia doubly indicated in the presence of nephritis. Although on two occasions severe acute nephritis had developed after a small operation under spinal anesthesia, the sudden renal impairment was due more to trauma and toxic absorption than to any effect of the anesthetic on the kidneys. With ether anesthesia it is more reasonable to admit a direct toxic action on the kidneys. The higher percentage of impairment of excretion as shown by the phthalein test gives reason to this assumption.

In tuberculosis of the lungs, chronic bronchitis, and all other diseases of the respiratory tract except those mentioned under contraindications, spinal anesthesia is preferable to inhalation anesthesia.

Persons suffering from hyperthyroidism can undergo operations on the lower part

of the body with spinal anesthesia without danger. The slowing of the pulse seen regularly with stovaine may be somewhat protective. Unfortunately operation for goitre is not safe with this method.

In their series of over 7000 cases no so-called status lymphaticus deaths have occurred. Where this complication could be anticipated spinal anesthesia would probably be preferable.

Spinal anesthesia is a method requiring special training and experience in order that reasonably good results be obtained and safety secured. This is most important in its selective field where cases presenting grave dangers are being handled.

It has a particular field in which it can be considered the anesthetic of choice in many respects.

It has a wider field of applicability in which less satisfactory but reasonably good results can be obtained.

LIQUID PARAFFIN DRESSINGS.

STEWART (*Medical Record*, June 23, 1917) notes that a rectified paraffin acts toward patients and bacteria much as interposed and sterile glass might do. It appears almost neutral to both germs and tissues. It does not become softened and macerated like the watery solutions, nor hardened as does alcohol, nor does it become rancid as do vegetable oils; nor do bandages soaked in it adhere, nor vulnerate on removal.

Three methods are used in bandaging. A couple of yards may be unrolled, cut off, and used to surround the limb after the manner of a sling. The ends of this short piece should be made to cross at the wound, and a pull should be made upon right and left hands at the same time, thus furnishing opposing forces which bring the wound edges together and relieve any strain which might tend to pull them apart. This maneuver may be repeated two or three times, or until the bandage is wound round and round the limb so far as its length will permit. When this is completed a pad or wipe is placed over the seat of the wound, and finally all fastened securely by a roller.

The wound should be cleansed, should be filled as full as possible with the paraffin, should be surrounded with cable cord to prevent direct pressure, should be bound with a rather short double-handed bandage, and the whole should be covered and completed in the usual manner.

If paraffin is to be used successfully, the dressings must be adapted to it, the wound must be prepared for it, and these are in addition to the usual teachings of good surgery. After a piece of cable cord (No. 60) has been dropped into a cup or bowlful of liquid paraffin it becomes promptly soaked. This cord is picked out with forceps and adjusted around a wound. Thus the wound cavity is deepened, its capacity for holding the paraffin is increased, yet at the same time the bandage is held off from coming into contact with the wound itself. The patient may be trusted to put upon the outside of an otherwise undisturbed bandage, one-half teaspoonful of the liquid every hour from 8 A.M. to 8 P.M., and one tablespoonful at 10 P.M. No harm can come from its abuse.

After a considerable trial of this simple method it was supplemented by adding one grain of calomel, 6 grains of iodine, and two drachms of ether to 2500 grains of liquid paraffin. The resultant solution looks like one of potassium permanganate. After standing for a few hours it precipitates hydrargyrum biniodide. About two-thirds of the iodine remains in solution, and the supernatant liquid is slightly antiseptic, though not at all irritating to wounds (peritoneum, urethra, etc., as test tissues) nor absorbable by the tissues, in which it is quite different from mixtures that contain animal fats or vegetable oils.

This solution dropped into sinuses causes prompt healing.

The writer states that if he were asked to plan a fool-proof technique for the laity or for first-aiders he would recommend this as standing the test of manipulation by ignorant and dirty fingers: Make a solution of one heaping teaspoonful of bicarbonate of soda, or of washing soda, or of hard brown laundry soap, to one quart and

a half of water. Boil hard for ten full minutes. Put in a fountain syringe and irrigate the wound thoroughly, using a medicine dropper for a nozzle. After running the whole quantity through and over the wound apply the liquid paraffin and bandage.

TREATMENT OF PELVIC INFLAMMATORY LESIONS.

CLARK and NORRIS (*Surgery, Gynecology and Obstetrics*, July, 1917) from a study of the subject reach the following conclusions:

In more than 500 cases in which the postoperative and remote results of surgical intervention in pyogenic infections in the Fallopian tubes were considered, they conclude that a course of conservative preparatory treatment decreases mortality, and enhances the chances for securing a good functional restoration of the pelvic organs.

In all cases of acute infections of the Fallopian tubes, the patient should be kept under observation until the course of the case is defined. (a) In the greatest majority the temperature subsides, the pain disappears, the tubal enlargements decrease to impalpable proportions, and if the attack is a primary one the patient may be given a respite from operation until a recurrent attack supervenes. Even under these recurrent conditions the conservative policy is again pursued until subsidence takes place a second time, when an abdominal operation is advised, with a view to treating existing conditions to the best possible advantage. Usually both tubes are removed and the ovaries are conserved. (b) If under the conservative plan the symptoms do not abate and the tube continues to enlarge, vaginal drainage is instituted, either by direct incision into the cul-de-sac or through the guidance of an abdominal incision.

In the purulent lesions of the tube, all operative procedures are attended with a higher mortality and a greater morbidity, whereas under a conservative waiting treat-

ment a patient will seldom die during an acute infection. In the upper series there was no death. In all hazardous cases the increasing severity of the symptoms and the enlargement of pelvic masses give ample warning, and permit of a simple drainage operation that will tide the patient over the danger.

When the acute attack has subsided the surgeon has the best opportunity for ascertaining, during the course of an operation, the exact degree of involvement of the tissues, and thus he is enabled to select the type of operation best suited to the individual patient.

Conservative operative procedures instituted with a view to restoring a closed Fallopian tube seldom restore fecundity. Plastic operations upon the fimbriated extremities of the Fallopian tubes, with a view to effecting restoration of fecundity, are almost invariably failures, and necessi-

tate additional operations. The authors believe, therefore, that the safer policy usually is to remove the tubes by a wedge-shaped cornual excision in all doubtful cases, thus disregarding any attempt at restoration of fecundity.

Hysterosalpingo-oöphorectomy in sexually mature women, the subjects of chronic infections of the uterus and adnexa, is followed by a lower mortality and a greater certainty of restoration to health than are possible after conservative operations.

Conservative operations employed with a view to preserving ovarian tissue should be limited chiefly to women under thirty years of age.

The routine drainage of pus-tubes through an abdominal incision is an unsatisfactory procedure from every standpoint, and should not be resorted to if it can possibly be avoided.

REVIEWS.

THE DIAGNOSTICS AND TREATMENT OF TROPICAL DISEASES. By E. R. Stitt, A.B., Ph.G., M.D. Second Edition, Revised and Enlarged. Illustrated. P. Blakiston's Son & Co., Philadelphia, 1917. Price \$2.00.

Dr. Stitt, for the Medical Corps of the Navy, and Dr. Craig, for the Medical Corps of the Army, have not only done exceedingly creditable work in the investigation of tropical diseases, but have laid the whole medical profession under obligation to them for advancing medical knowledge and bringing the American medical profession before the profession of the world as being in the vanguard of scientific investigation.

Dr. Stitt's opportunities for studying tropical diseases have been world-wide, and it will be recalled that he has also written a most excellent book upon Practical Bacteriology, Blood Work, and Animal Parasitology, which is now in its fourth edition.

Every year increases the opportunity of American medical men becoming thoroughly familiar with tropical diseases, since the

constant extension of American influence in tropical and subtropical areas is not only bringing more and more tropical diseases to our shores, but is also sending many medical men far afield in the practice of their profession.

The copious illustrations found in this volume are a very material addition to the text. The earlier edition took a commanding position in the literature of this subject, and the present edition will materially increase the reputation of the author and still further popularize any contributions which he may make to the subjects in which he is recognized as an authority.

In the present edition two new chapters have been added to the section on the diagnostics of tropical diseases. One of these deals with special problems attaching to diagnosis in the tropics with a brief discussion of the peculiarities and frequency of cosmopolitan diseases in these areas, and the other deals with the diagnostic value of

clinical manifestations from the side of the cutaneous system and the organs of the special senses. Matter which is of sufficient importance to be included, but which is not of first-grade importance, is printed in small type in order to save space.

MALINGERING OR THE SIMULATION OF DISEASE. By A. Bassett Jones, M.D., and Llewellyn J. Llewellyn, M.D. With a chapter on Malingering in Relation to the Eye, by W. M. Beaumont. P. Blakiston's Son & Company, Philadelphia, 1917. Price \$7.00.

This is quite an exhaustive work upon a subject which at the present time is of greater importance all over the world than ever before. First, because the introduction of the plan of workmen's compensation tempts malingerers, and second, because the multitude that are being taken for military service also increases the number of persons who desire to misrepresent their condition, or to present symptoms or lesions seemingly so grave that they may be exempted from military duty.

As the author points out, the study of malingering has not received the attention from the general medical profession that it deserves. If it received more attention it is probable that an accurate diagnosis in ordinary practice would be made with greater frequency, for sometimes functional and organic disease, directly or indirectly, produces a mental state which makes a patient a conscious or an unconscious malingerer in the sense that he describes symptoms that he does not have, or is firmly convinced that actual lesions are present in his body, when, as a matter of fact, they are solely in his imagination. Many of these patients deserve sympathy, not only because of the underlying pathological state but still more because of the mental state which has been engendered; nevertheless, to relieve both the physical and mental state is the function of the physician, and this relief cannot be obtained until he has made an accurate diagnosis along both lines.

In the present book there are no less than thirty-three chapters, divided into five sections. Beginning with a historical introduction and discussing the etiology of

malingering, the authors deal with the influence of recent legislation, the psychology of malingering, its diagnosis, and the formation of a decision on the part of the examiner. In section two malingering in relation to the nervous system is considered in no less than fifteen chapters, thereby forming, as we would naturally expect, the greater portion of the volume. In section three malingering in relation to internal disease is considered, and in section four malingering in relation to accident is discussed. Section five deals with measures for the restriction of malingering.

In one sense this book may be said to be one dealing with diagnosis, for practically every chapter contains careful descriptions of methods of examination, psychical and physical, for the purpose of uncovering the fictitious or real conditions which are present. The book is one which will be of great interest to all medical men, and particularly to those who have to deal with the subject of recruiting or workmen's compensation. There are a number of plates introduced to make the text more clear. We regret that more illustrations of some of the external conditions described are not included.

The book is well printed, reveals an intimate knowledge of the subject, and will undoubtedly prove to be the standard work on this subject for a long time to come.

DISEASES OF THE CHEST AND THE PRINCIPLES OF PHYSICAL DIAGNOSIS. By George William Norris, A.B., M.D., and H. R. M. Landis, A.B., M.D. With a chapter upon The Electrocardiograph in Heart Disease by Edward B. Krumhaar, Ph.D., M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1917. Price \$7.00.

It is not often that a book appears written by two authors. When it does appear and both authors are responsible for all the text there is such conflict of opinion, or such lack of character in the text, that the book is spoiled. This is avoided in the present instance by Dr. Norris devoting himself to the physical examination of the lungs and the circulatory system, whereby some two hundred and fifty pages of the book are covered, while Dr. Landis writes upon diseases of the bronchi, lungs, pleura

and diaphragm, and diseases of the pericardium, heart, and aorta. As the volume contains nearly eight hundred pages it is readily seen that Dr. Landis contributes the greater part of the text. The illustrations are excellent, and we are sorry that the opening pages of the book do not contain an index of them—that is, a list of illustrations. Most of them, of course, are black and white, but there are plates in color. Dr. Landis, as director of the clinical department of the Henry Phipps Institute for Tuberculosis, has had very large opportunities for the study of thoracic conditions, and the pathological material which he has had for study has been plentiful. The scope of the book is very well defined in its title, but such a title might precede text of mediocre value. We have gone over the text, however, with more than usual care, and have arrived at the conclusion that the authors, particularly Dr. Landis because of the wide scope of his subject, have made a very noteworthy contribution to our knowledge of diseases of the chest.

It is refreshing to read a book which is not merely a restatement of facts already known, but one which joins to such facts the results of original investigations, and ideas, by men who have devoted a very considerable period of time to the study of their subject and an immense amount of labor to the compilation of their volume.

A MANUAL OF PERSONAL HYGIENE. By American Authors. Edited by Walter L. Pyle, A.M., M.D. Seventh Edition, Revised and Enlarged. W. B. Saunders Company, Philadelphia, 1917.

Ten contributors have prepared the text for this volume of a little over five hundred and fifty pages. Its object is to present a plan for proper living upon a physiological basis. In other words, to set forth plainly the best means of developing and maintaining physical and mental vigor. The first edition appeared seventeen years ago, and the present edition does not very materially differ from the sixth, except to contain some new paragraphs of timely interest. The book, of course, is intended more for lay reading than for the graduate in medicine, but, after all, it is a noteworthy fact

that the graduate of medicine, however clever he may be in taking care of other people, is known to be extraordinarily lacking in his ability to take care of himself and in carrying out hygienic methods of living which would inure to his own advantage. Practitioners, old and young, therefore, will learn much from this book which will not only be advantageous to their patients, but to themselves, and, unlike many volumes of this character, it can be placed in the hands of patients without the fear that as a result they will obtain a host of mutilated or distorted ideas in regard to the physiological processes in their bodies. It is perhaps the best effort at presenting medical facts in a readable form for the lay mind that has yet appeared.

NUTRITION AND CLINICAL DIETETICS. By Herbert S. Carter, M.A., M.D., Paul E. Howe, M.A., Ph.D., and Howard H. Mason, A.B., M.D. Lea & Febiger, Philadelphia, 1917. Price \$5.50.

Within the last ten years, as we have pointed out within the last few months in the review of another book dealing with dietetics, a very considerable number of contributions to the literature of this subject have appeared. Some of them have been elementary and some of them scientific and exhaustive. The present book aims to be in the latter class, as it contains about six hundred and fifty pages. Part I deals with foods and normal nutrition in general terms; Part II with individual foods; Part III with feeding in infancy and childhood; and Part IV with feeding in disease. Naturally, this portion of the volume takes up the greatest space, extending from page 271 to page 600. The book is very well printed on excellent paper and easy to read.

Unlike many other volumes which are the work of three authors, it is not uneven in quality. Dr. Carter writes as a medical clinician, Dr. Howe as a biological chemist, and Dr. Mason as a pediatricist. There can be no doubt that in the practice of many medical men too little attention is paid to diet, while, on the other hand, in some cases too rigid rules are prescribed, the physician seeming to fail to recognize that the body

has wonderful powers of adjusting itself to its nutritional needs.

The present volume is a practical, clinical statement of modern knowledge in regard to food values expressed in such a way as to be more useful to the practitioner than to the physiological chemist.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by Hobart A. Hare, M.D., Assisted by Leighton F. Appleman, M.D. Volume Three, September, 1917.

As in previous years, the present volume contains an article by Dr. Ewart, of London, upon Diseases of the Thorax and its Viscera, Including the Heart, Lungs and Blood Vessels; another upon Dermatology and Syphilis by Dr. Gottheil, of New York; the third important clinical article is by Dr. Davis, of Philadelphia, on Obstetrics; and the fourth on Diseases of the Nervous System, by Dr. Spiller, of Philadelphia.

The design of *Progressive Medicine* is to afford a story, or narrative, of medical and surgical advances for the last twelve months. That it does so would seem to be shown by the fact that not only has it proved of use in civil life, but that its usefulness has been favorably noted by those who are using it while engaged in active service in France at the present time.

A TEXT-BOOK OF MATERIA MEDICA FOR NURSES, INCLUDING THERAPEUTICS AND TOXICOLOGY. By George P. Paul, M.D. Third Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia, 1917. Price \$1.50.

When an author writes a book with this title and attempts in less than three hundred pages, including the index, to cover *materia medica*, therapeutics, and toxicology, he is forced to resort to an amount of concentration which is difficult of accomplishment, and the question at once arises as to whether he has been able to introduce much of any of these important subjects. Of course, it is not expected that the volume will be exhaustive. Some of the statements, necessarily dogmatic, give questionable information. Thus we are told that acetanilid is a cardiac depressant, but that, unlike

antipyrin, it produces a stronger pulse. Probably the author intended to state that it does not depress the pulse as much as antipyrin. Furthermore the statement that acetanilid is used as an antipyretic in tuberculosis hardly gives a correct conception of its proper employment, since this is a type of fever in which it nearly always does harm. Under ammonia we are told that spinal activity is augmented and convulsions may be brought about, which we think gives an erroneous impression as to the possible results of the use of this medication, and the statement that neosalvarsan, which "differs a trifle from salvarsan, is as efficient as the latter drug, but is said not to be so toxic," hardly represents the facts as the profession believe them to be to-day.

HANDBOOK OF ANATOMY. By James K. Young, M.D., F.A.C.S. Fifth Edition, Revised and Enlarged. Illustrated. F. A. Davis Company, Philadelphia and London, 1917.

This well-illustrated compend, clear in its text, logical in arrangement, represents an excellent text-book for students, and is a most useful reference book to the practitioner who wishes to become quickly informed of anatomical points which have escaped his memory.

The Basle nomenclature has been incorporated. A special chapter comprising Anatomy of the Face, Teeth and Jaws has been prepared by Joseph L. Appleton. The book opens with an admirably condensed osteology; thereafter in sequence Articulations and Ligaments, The Muscular System, The Heart and Vascular System, The Alimentary Apparatus, Vocal and Respiratory Apparatus, The Genito-urinary Apparatus, The Nervous System, Organs of Special Sense, Surgical Anatomy, Dental Anatomy.

A MANUAL OF ANATOMY. By Henry Erdmann Radasch, M.Sc., M.D. Illustrated. W. B. Saunders Co., Philadelphia and London, 1917. Price, cloth, \$3.50 net.

This excellent book, made up in Saunders' best method, with illustrations distinctly helpful to the text, some of them of very high quality, sets forth in such form as is best calculated to enable the student

to formulate and systematize his knowledge, the essential facts of anatomy. As to the nervous system, the various pathways are taken up and given separate and rather full consideration, so that impulses may be traced, in a connected manner, from origin to termination. The semilunar valves of the aorta and pulmonary artery are described with their respective vessels. Moreover the Basle nomenclature is used throughout. Credit is given for illustrations, to which the compliment of borrowing has been accorded; there are some excellent pictures from specimens in the Daniel Baugh Institute of Anatomy. This is an excellent text-book for the student and a ready reference book for the practitioner.

HANDBOOK OF GYNECOLOGY. By Henry Foster Lewis, A.B., M.D., and Alfred De Roulet, B.Sc., M.S., M.D. Illustrated. C. V. Mosby, St. Louis, 1917.

This book was prepared to meet the needs of third- and fourth-year medical students and the young practitioner who has not yet settled on a special field and justly bases whatever claim it has to recognition or acceptance and use upon its even balance in regard to the space and accentuation given to the various topics discussed in relation to their relative importance. There is a somewhat original and distinctly serviceable classification based upon teaching experience. After chapters devoted to Anatomy, Physiology, Diagnostic Methods, Asepsis and Gynecology, The Care of the Patient Before and After Operation receives particular attention. Thereafter follow sections on Anæsthesia, Anomalies of the Female Genitals, Uterine Displace-

ments, Injuries of the Female Genitals, Gynecological Hernia, Infection of the Female Genitals, Neoplasms, Ectopic Gestation, Symptomatic Disorders, and Neuroses and Psychoses.

The illustrations are excellent and helpful. The directions throughout are those accepted as standard by most clinics. The reader is not confused by a multiplicity of methods, and the work is admirably adapted for the class for whom it has been written.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume II, General Surgery. Edited by Albert J. Ochsner, M.D., F.R.M.S., LL.D., F.A.C.S. Series 1917. The Year Book Publishers, Chicago. Price \$2.

In the introduction to this volume Ochsner pays a beautiful and well-deserved tribute to Murphy, the surgeon, marked by the appreciation of a fellow technician and the affection of a close personal friend.

Ochsner has gathered from current literature, with that ripe judgment so pre-eminently possessed by him, the best and most serviceable, and sets it forth in a clear fashion. Under the caption Analgesia he is opposed to nitrous oxide and in favor of ether by the drop method. Allen's excellent study on Analgesia and its rather sharp localization is considered.

The Treatment of Infected Wounds includes the light method, saline solution, Dakin's fluid, colloidal gold, soap, and a number of other antiseptics. The treatment by light is considered favorably. There is a section, and a most interesting one, upon Operative Technic. It includes War Surgery.



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ORIGINAL COMMUNICATIONS.

SOME GENERAL CONDITIONS BEARING ON TREATMENT OF SYPHILIS.

BY EDWARD MARTIN, M.D.,

Professor of Surgery in the University of Pennsylvania, Philadelphia.

Concerning the infecting organism of syphilis, neither its life history nor its place in a broad biological classification is definitely established. That it is vulnerable to desiccation, heat and many bactericidal substances is well recognized. That it is unable to penetrate an unbroken skin or mucous surface is commonly accepted.

Its method of transmission to the ovum is unknown. It is commonly believed that this transmission is from the mother, who must herself be infected before she can bear a syphilitic child; an argument, but not a convincing one in this direction, being based upon the circumstance that the spermatozoon is mechanically unable to harbor even a single spirochete. This concept entirely brushes aside, among others, the possibility of this organism undergoing changes of form in its life cycle.

It seems fairly well demonstrated that the drugs of greatest use in the treatment of syphilis do not depend for their efficacy upon their bactericidal qualities. It is known that under suitable culture conditions the microorganism may live in the laboratory for many years. It has been shown clinically that it does so habitually in the human; at times without clinical symptoms, at times with very definite and characteristic symptoms, and more often with symptoms which are not recognized as dependent upon an underlying syphilitic lesion.

It seems to have been shown that the

seats of predilection in the human are vascular and perivascular, and that many, if not all, of the subjective and objective symptoms of the disease are due to this location and the reaction excited thereby.

Clinical histories prove that patients may become infected, even intelligent patients, and particularly doctors, without knowledge of a primary lesion or without trace of such having existed.

Except in hereditary syphilis, and that mysteriously acquired by a woman pregnant by a syphilitic man, the disease first manifests itself by a somewhat typical sore at the seat of primary invasion. Without any treatment this sore may heal and no further manifestations of the disease may appear through life. Usually this sore is followed in a definite period—*i.e.*, about six weeks—by the local and constitutional signs of systemic infection, which may be prevented by treatment.

Given a primary sore there is no assurance that an individual patient will ever be entirely rid of his infection, though under skilled care he will probably show no signs of this infection, and should he procreate will have clinically healthy children. Even when rationally treated there is no convincing evidence that syphilis in a large proportion of cases, or for that matter ever, is entirely eradicated. The only evidence to this effect being the increasingly large number of reported cases of reinfections, some of which are not convincing.

There is evidence to show that syphilitic infection under the best supervision materially shortens life and impairs function.

Though no symptoms develop which suggest the underlying nature of the devitalizing infection, there is accumulated evidence of the fact that from five to ten per cent of the population of this country are syphilitic.

Concerning the cure of syphilis, or rather its treatment, there are some apparently well-grounded beliefs. As in all infections, cure begins in prevention. It is probably the most preventable infection known, as it is probably the most general and badly treated. It is practically transmissible only in its early stages, to this rule there being some exceptions. It can be made non-transmissible in twenty-four hours by arsenical treatment, and can be so maintained. There are no laws by which a degenerate and contagious syphilitic can be forced, to his own large physical good, to become non-contagious. As soon as the people really wish it the disease can be brought strictly under the jurisdiction of the public sanitarians.

In the treatment of the disease the arsenicals, the mercurials, the iodides, and incidentally certain vegetable compounds, particularly those of sarsaparilla, are employed. Of these the first three are of certain value and are universally used.

The preparations of arsenic and mercury are particularly applicable in the early stages of the disease, during which period the iodides seem as a rule to be distinctly hurtful. By the arsenical preparations the patient may be rendered almost immediately non-contagious and his lesions to disappear with magical promptness. Mercury has not lost its vogue, and upon it many syphilographers still place their main dependence, supplementing it, and powerfully, by arsenic. Few, if any, depend upon the arsenic preparations alone. For manifest lesions both arsenic and mercury seem indicated at any stage of the disease. The rule of dosage is a comparatively simple

one—*i.e.*, as much as the patient can take without affecting his health.

As to the method of use, the arsenical preparations are universally given intravenously. There is an impression favoring the value of salvarsan, under its various names, as compared to neosalvarsan. Because of its easier preparation and its apparently greater safety, incident to its more stable composition, neosalvarsan is largely used, usually in considerable concentration and by means of the ordinary glass hypodermic syringe, 10 or 15 Cc. of sterile water being regarded as a sufficient diluent for doses of .3, .6, or .9 gram. Small doses frequently repeated, at intervals of three to nine days, seem safer and more efficacious than large doses; a series of these, generally four to six, being followed by mercury. Arsenical preparations are somewhat unstable, subject to slight variations, and individual samples may be distinctly toxic.

The reactions which usually follow these injections are conspicuous by their absence, but occasionally such reactions occur, and there is little doubt that there are some fatalities which have not found their way into current literature.

It must be remembered that arsenic is a vascular poison and will manifest itself first upon the kidneys in the form of polyuria, but later in the form of suppression. Therefore an observation of the total quantity of urine is desirable in giving a series of injections, since the polyuria is a warning of what may follow from overdosage. Neither casts, blood, nor other pathological element will appear in the urine of the patient moderately overdosed with the arsenical preparation. Mercurials are given by hypodermic injection, by inunction, or by the mouth; sometimes by intravenous injection. The rate of absorption in all of these methods varies extremely, nor is one from this standpoint largely to be preferred to the other. The safest method is by inunction, the usual dose being a drachm a day for six days, with three days' rest; two, three, or four of

these courses being given in a series. Prolonged rubbing is not important; prolonged contact is. Perhaps the best technique is to instruct the patient to select various areas of the trunk, rubbing in a specific quantity at night for five minutes and putting on an undershirt, which protects his night garments. This undershirt is preserved and becomes of increasing value with the passing of time. The patient takes his customary bath in the morning and puts on clean clothing. For the hypodermics the soluble preparations are safer and more efficient than the insoluble ones. In either case the rate of absorption varies, but particularly so with the insoluble preparations, and at times these injections cause intolerable, indeed crippling, pain; nor is there any way of predicting when this will occur. The patient who has had a hundred injections without complaint may take to his bed for three days with the one hundred and first. Many patients do extremely well with mouth administration, which is wisely interrupted and, when possible, supplemented by inunction. Hydrarg. cum creta 1 to 2 grains three times a day, the protiodide of mercury one-quarter to half a grain three times a day, are perhaps the favorite drugs.

Mercury will demonstrate its toxic effects on the kidneys by salivation, by albuminuria, and by casts. It is an epithelial poison, hence the urine should be watched whilst the patient is under treatment with mercury. Clinically metallic taste, heavy breath and free salivary flow are early toxic symptoms.

The iodides, particularly the iodide of potassium, are given in the later stages of syphilis—*i.e.*, after one or two years—preferably in small doses, long continued and short of producing toxic symptoms. Occasionally in the presence of clinical

symptoms, with or without a positive Wassermann, iodides in huge doses work miracles. Usually when thus given they greatly aggravate the miseries of the patient.

All antisyphilitic drugs if efficient are so fairly promptly. Their long continuance without clinical betterment is inadvisable.

Concerning the duration of treatment it should be through life, until we have positive proof that our present intensive form of early therapeutics is sufficient.

Having treated these cases now for many years, the fewest number of late recurrences have been among those who spring and fall have with entire regularity taken fairly active treatment.

The most important single point in treatment is to recognize the fact that it is not the drug which cures the infection, but some alteration in metabolism accomplished by the drug; that this desirable alteration, to reach its maximum, depends largely upon the general bodily health, and that any drug which lowers vitality thereby defeats its object.

There are very definite indices as to health, and the most delicate and assured is psychic—*i.e.*, the patient's cheerfulness and capacity for sustained and concentrated effort, either mental or physical. Next comes the body weight, which should be maintained, unless it be excessive at the beginning of treatment. Next comes restful sleep, normal appetite and digestion, normal output from the kidneys. These indices should be carefully observed, since on them should be based the vigor of treatment. When they are lowered, even intermittently by treatment, the progress toward cure has been slowed; when progressively and continuously lowered the underlying infection has been stimulated indirectly by a lessened vital resistance.



EPITOME OF THE PRESENT TREATMENT OF SYPHILIS.

BY ALEXANDER RANDALL, M.A., M.D., PHILADELPHIA.

Scientific medicine of to-day studies a disease from four different points of view—that is, there are four unknown aspects of a malady that have to be solved before we can hope to control the disease. These four different points to be solved are (a) the causative agent; (b) the mode of transmission; (c) a means of absolute diagnosis; (d) and a specific therapeutic agent. A moment's retrospect will tell you that, though we have some of all these criteria worked out in almost every disease, there are few, if any, where the sum total is complete, and not until the truth has been established for each of these four problems can we truly feel we have that one disease under medical control.

Fifteen years ago syphilis was a disease uncontrolled and unknown, though probably no other had been so well studied, so well described, appreciated, and earnestly treated; and in spite of all it went on its way, untrammelled, unhindered, uncured—manifesting itself in a multiplicity of lesions and ways so protean that, as Osler truly said, "He that knows syphilis knows medicine."

There are estimates of recent date giving the number of syphilitics in this country alone as being 10,000,000. Vedder says 16 per cent of the adult working class, and 5 per cent of the college class.* Church possibly puts it in another way by saying that one man in every five is syphilitic.

Appreciating some of these statements, if not all, in regard to one of the most prevalent and stubborn of diseases, what do we know to-day that we did not know fifteen years ago, and what can we do now that was impossible then?

In the first place our four criteria, essential for our proper knowledge and control of the disease, have all been fulfilled. The specific organism is now known and its transmission is understood; we have had given to us a test (Wassermann) whose specificity is no longer questioned; while from the point of view of therapy syphilis

to-day stands alone, for we have not only one specific antidote, but two (really three) with which to combat its progress. One could hardly ask more, and yet even greater powers are ours. For the first time in the five centuries that syphilis has been recognized we are not only curing the disease, but in certain early stages this is being accomplished with only *one dose* of a medicinal agent. No other disease in medical knowledge stands in the same category with syphilis to-day—once the scourge of mankind, syphilis to-day is allowed to exist wholly dependent upon the wisdom with which we apply our powers of eradication and control.

How may they best be applied? First, as regards the various preparations now on the market: The German product salvarsan has been copied and produced commercially in France, Canada, and the United States. The American preparation is known as Arsenobenzol, the Canadian as Diarsenol, and the French as Arsenobenzol (Billon). They are all based on the original dosage of salvarsan—i.e., the maximum dose in the adult male is placed at 0.6 gramme—and they all seem to be accurate copies of the German product. They are each one prepared for use in a similar way by *first* dissolving in sterile distilled water (or sterile normal salt solution) the powder in the ampoule, in which it forms a clear *acid* solution, unfit for intravenous administration until its reaction is changed; it is *next* precipitated by the addition of an alkali, sodium hydroxide, a slight excess of which causes a complete redissolving of the precipitate and a perfectly clear alkaline solution. Care should always be used at this stage that an excess of alkali above what is necessary is not added. Shaking always aids the dissolving. There are slight variations in technique according to which preparation is employed, but four general rules should be accentuated, viz.:

1. Follow the directions in the package implicitly.

2. Use it in large dilutions, 150 to 200 Cc.
3. Inject it only intravenously.
4. Use it *immediately* after preparing it; never have a druggist prepare it and send it around; fifteen minutes' standing may be put as the absolute limit of safety between preparation and use. This is because of the rapid change that the high arsenical percentage undergoes on exposure.

Neosalvarsan has been copied by the French, and is marketed under the name of Nov-arseno-benzol (Billon). These two preparations go immediately into solution in sterile distilled water, or sterile normal salt solution, and can be given as first dissolved as they form a proper alkaline solution. They are also soluble in small amounts of fluid and can be safely given by aid of a glass syringe made up in doses of 15 to 20 Cc. (or 0.15 of drug to 2 Cc. of fluid). The adult dose is placed at 0.9, and is supposed to be the equivalent in arsenic content of 0.6 of salvarsan. This solution should not be hot, but should be made up and given at room temperature, again following the intravenous administration and absolute freshness of preparation.

Dosage.—Let your dosage be governed by the following rules: It is always safe in judging dosage to be guided by the body weight of your patient. The maximum adult dose (0.6 of salvarsan and 0.9 of neosalvarsan) is based on a man of 150 pounds of body weight. Proportionately decrease this in smaller individuals; always make the first dose administered one size smaller than the full adult dose per weight, by either preparing a smaller dosage ampoule or by using only a portion of that prepared; and give to women consistently one size less than the relative dose per weight for man.

Frequency, time, and number of administrations depend upon the stage of the disease. The arsenic in the drug is totally eliminated by the third or fourth day after injection.

Primary Stage.—Our present ideas and teaching, backed by the ability of early diagnosis, run counter to all the sober dic-

tates of our forefathers. They maintained, very properly, that before the stigma of syphilis was placed upon the remaining days of a patient the clinician must be certain of his diagnosis, beyond peradventure. This meant in their day that the appearance of the secondary skin manifestations must verify their suspicions as to the character of the initial lesion. This period of waiting was somewhat shortened with the advent of the Wassermann test, and the physician then waited until this became "positive," which usually occurs about the twelfth to the fourteenth day after the appearance of the initial sore. To-day we feel that the appearance of the positive blood test means that the localized infection is becoming, or has become, generalized, and we strive to arrive at an absolute diagnosis of the initial lesion during these few flitting days before general dissemination of the infection. This diagnosis is based on the character of the lesion and the finding of the specific *Spirochæta pallida* by the aid of the dark-field microscope. If treatment can be instituted at this time, it has been repeatedly demonstrated that the powerful arsenical preparations hold forth the possibility of a real abortion of the infection of syphilis, and the complete eradication of the disease before it has spread beyond the confines of nature's first efforts toward resistance.

There are undoubtedly cases in which in this period the disease has been completely cured by one injection of salvarsan, but it is not safe to trust to such a chance, and the advice of to-day is to give the patient at least four intravenous injections of salvarsan, or its imitation products, using it in preference to the neosalvarsan. This should be followed by mercury in some of its forms, for we must take advantage of the known specificity of this drug also. Personally I prefer the deep gluteal injections of the mercury salicylate put up in cacao-butter and in one-grain dosage. The salvarsan should be administered at intervals of five days. The mercury is started after the fourth injection of the salvarsan.

and given at weekly intervals for the next three months at least. Wassermann tests should be consistently negative, and two years without treatment and repeated negative blood tests will warrant the conclusion that a cure has been established.

It should be remembered that a recurrence when such an infection has been aborted is the return of a chancre at the same point. These recurrences have undoubtedly been taken in the past as real reinfections, as the habits which produced the first are apt to be still present, and a recent exposure is supposed to account for a second infection. There are many such cases cited in the literature of to-day as exemplifying cure and reinfection, which ought properly to be classed as the recurrence of an incompletely cured local infection. The length of time that such a recrudescence may make its appearance may be several months after the disappearance of the primary sore.

Secondary Stage.—This should be considered to have started as soon as the Wassermann test is reported positive, which will be before the appearance of the skin eruption, for the "positive" test indicates that dissemination of the initial infection has started. The treatment of to-day is intensive saturation of the system first with the arsenic preparations, then with mercury, and keeping these two efficient specifics actively at work until the desired negative blood test is obtained, and even then making doubly sure by pushing the therapy for a few months after this end is accomplished.

Start by giving salvarsan at five- to seven-day intervals, or the neosalvarsan, for at least six doses; follow this by mercury inunctions every day for twenty-four doses. Wait ten days and then take a blood test. If this proves positive, start in and repeat your salvarsan and follow it by mercury again, the latter preferably by inunctions, or you may use the intramuscular injections at weekly intervals. A negative reaction once obtained should be held so by continuing the treatment by mercury for the following six months, when one may

change to the other method of administration and give it by mouth. Wassermann tests at intervals of a month will be the guide, and on the slightest indication of a return to a positive reaction a repetition of the salvarsan administration is advisable. Some men feel that in order to play the game absolutely safe there should be a course of three injections of salvarsan or neosalvarsan, after a negative Wassermann test has been first obtained. I cannot but feel that were the question a personal one I would also desire the course of arsenic after the first negative reaction.

The question of the determination of when a cure has been established in the secondary stage becomes more difficult the longer the infection has been present. Again two years of repeatedly negative blood tests after the complete stoppage of all medication is the lowest limit of safety. The value of the so-called "provocative test" has been questioned. In all cases of secondary and tertiary syphilis one must appreciate the possibility of a focus of infection in the central nervous system, and a negative spinal fluid Wassermann test should also be demanded before the patient can be discharged.

Tertiary Stage.—Its variations are so manifold that rules of treatment are hardly advisable. In this stage there is, or should be, practically always a positive Wassermann test from the spinal fluid as well as the blood serum. One can comparatively easily obtain by treatment a negative blood reaction, but the spinal fluid must also be proven negative. The efforts of the investigators have been toward increasing the amount of arsenic or mercury that gets into the spinal fluid during administration in order to bring an increased amount of the therapeutic agent to the seat of disease, for apparently the choroid plexus does not allow the passage of great amounts of such drugs to enter the spinal fluid, or the spinal fluid itself changes so slowly that the opportunity is slight for such medicines to get there in any strength before the body eliminates the dose *in toto*. To circumvent

this the Swift-Ellis treatment of injecting intraspinally salvarsanized serum was started, followed later by Byrnes's method of mercurialized serum. A more rational and more easily applied method is that of Corbus, who gives the patient full doses of salvarsan every two days for five doses, and one hour after the fifth administration there is withdrawn 5 Cc. of spinal fluid by lumbar puncture. It has been demonstrated that by this means there is drawn through the choroid plexus a sudden influx of fluid in which is found a larger amount of the specific drug than one would dare to inject at one time by the intraspinal injection method. This course of treatment can be repeated in ten weeks' time, and an active mercurial medication is carried on in the meantime. One of the especially noticed benefits of the arsenical treatment of tertiary syphilis is the marked improvement in the psychical condition of these cases, and their mental uplift is most encouraging.

The establishment of a cure when the central nervous system has been involved must be looked at from two points of view.

We feel that it is possible to halt the progress of the disease and in some cases to bring the infection to a complete standstill, possibly to overcome it entirely. But the second point is that when you have a destructive lesion of such a structure as the brain or the spinal cord, where every portion is essential to the performance of some function, it cannot be expected, nor do we see it, that a restitution of that tissue and function is accomplished. Ofttimes a patient with an advanced tabetic walk is so greatly improved that he can throw away his walking-stick, et cetera, but this improvement and return of function is probably due to the removal of edema, or inflammatory exudate, accentuating the trouble, rather than an actual healing of destroyed structures.

The effort should be made to obtain a negative blood and spinal fluid Wassermann test, and the patient ought to be very carefully followed by repeated examinations of the same, for here we see remissions more frequently than in any other form of involvement.

SOME CONSIDERATIONS ON THE MODERN TREATMENT OF SYPHILIS.

BY CHARLES W. BONNEY, M.D., PHILADELPHIA.

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The discovery of the *spirochæta pallida* and its recognition as the causative agent of syphilis, together with the elaboration of the powerful chemical spirilloicide, salvarsan, have wrought many changes in the treatment of this disease. Not only do the changes thus brought about have to do with the administration of salvarsan and its congeners, but likewise concern the employment of the older remedy, mercury. Moreover, the discoveries have relegated to a position of lesser importance that time-honored remedy, potassium iodide.

One of the greatest blessings resulting from the discovery of the cause of syphilis is the more general acceptance of the idea that intensive treatment is essential in order successfully to combat the inroads of the disease. In other words, this means

that the drugs which kill the spirochetes and overcome the tissue alterations which they produce must be given to the limit of toleration. Although such treatment has been used by specialists in Europe, and to some extent in Great Britain and this country also, for twenty-five years or more, its necessity was not generally appreciated until syphilis came to be universally recognized as a spirillosis. Prior to the year 1910 a form of therapy much in vogue was the so-called tonic treatment, which consisted in the administration of pills of protoiodide of mercury or gray powder by mouth, the patient being given these drugs in ascending doses until gastrointestinal disturbance or slight sensitiveness of the gums was produced, whereupon the dose which he was taking at that time was

reduced one-half and was then administered continuously for a period of two to three years.

Thus it was deemed feasible to effect a cure by a method mathematically accurate, easy of application, and devoid of any unpleasant accompaniments or consequences. With the advent of salvarsan, however, this complacency gave way to an enthusiasm for an energetic and rapid, not to say magical, subjugation of the disease; and despite the fact that the theory of a *sterilisatio magna* was abandoned by serologists and syphilographers almost as soon as its possibilities had been investigated, many doctors long continued to regard the new preparation as one by which syphilis could be promptly eradicated. Indeed, it was not uncommon for patients to remark that they would like to take an injection of the new medicine and be cured—so erroneous a conception of the potency of the drug had they obtained from statements made to them by their physicians. This misapprehension resulted in much harm. The prompt disappearance of superficial lesions, which so often follows the administration of one or two injections of salvarsan, was considered ample proof that the invading hosts of parasites had been vanquished. The evil heritage of such a fatuous supposition soon began to manifest itself, and patients with relapses of various kinds were plentiful enough in both clinic and consulting room.

Time, however, has brought about a better understanding of the value of the new remedy, its limitations, its methods of application, and its dangers. Naturally one's estimate of it will depend in part upon his own individual experience. At the present time, however, the consensus of opinion seems to be that salvarsan is a far more powerful spirillocide than mercury; that its action is more prompt; that it controls the clinical manifestations of syphilis more quickly than mercury; and that it reduces the blood reaction from positive to negative in a shorter period of time. That it, alone, suffices is not conceded

by those whose experience best qualifies them to express an opinion.

If any hope is to be entertained of effecting a cure approaching the *sterilisatio magna* of early salvarsan days it can concern only those patients treated in the incipency of their primary stage; for example, during the first week or two after the initial lesion has appeared. There is evidence to show that some patients so treated do not develop a positive Wassermann reaction; but it must not be forgotten that many of the statements in literature to this effect are made concerning patients who have been under observation for only a few months. While heartily in favor of an intensive salvarsan treatment in such cases, I cannot but feel that the best interests of the patient are safeguarded by following it with an equally intensive mercurial treatment. In my own practice a few patients subjected to this combined method have not shown a positive Wassermann reaction at any time; some have gone as long as three years and eight months without showing a positive reaction. In all of these cases the spirochetes were found in the initial lesion, so there was no doubt as to the correctness of the diagnosis. To affirm, however, that these patients are absolutely cured, I do not believe to be warranted. What the future may have in store for them no one can tell.

It is impossible to formulate a plan of treatment that can be applied to every case; but, as a working rule, it may be stated that an intravenous injection, consisting of 0.6 salvarsan or 0.9 neosalvarsan, should be given every week until four or five have been administered, provided, of course, that no bad effects are produced. Personally I prefer to give four or five full doses rather than a greater number of smaller ones. Such an intensive treatment I give only to patients who are in good general health. Naturally, age, physical condition, and personal habit act as modifiers of any system of therapy. My patients who took this intensive salvarsan treatment have, almost without exception, lost a few pounds

in weight, and one of them developed a mild neuritis of the lower extremities, the musculocutaneous and anterior tibial nerves being affected. Others had very sharp reactions after the third injection. The possible bad effects of such treatment should always be explained to the patient, and, moreover, the conduct of the treatment should always be governed by his reaction to the preceding injection. If the first injection is followed by a very severe reaction, another one should not be given for some time; and, in the event of alarming symptoms supervening, it would be prudent not to repeat the injection at all. It must never be forgotten that salvarsan and neosalvarsan may occasionally kill a patient.

Provided that four or five full doses at intervals of a week have been tolerated, a week or ten days' rest is given after the last injection and the patient is then put upon an intensive mercurial treatment, consisting of injections of biniodide of mercury in oil. For eleven years I have used for this purpose the French preparation known as cypridol, and find it satisfactory in every respect. I give the full contents of a 25-minim glass syringe every day until the limit of toleration is reached, making the injection in the gluteal region well away from the line of the sciatic nerve. A metallic taste, increased salivation, a sense of elongation of the front teeth, and slight sensitiveness of the gums will be the signs that enough has been given. Slight looseness of the bowels may be disregarded or, at the most, considered as only a prodrome of the other symptoms. After the latter have subsided, which will usually be within a few days, another course of injections is given, although, perhaps, the patient may not be able to take as many without developing signs of intolerance to the drug as he did during the first course. If for any reason he cannot come often enough for the injections of soluble mercury, an insoluble salt, such as the salicylate, may be given once every five to eight days. Of

this salt, one and a half grains is none too large a dose.

This method of treatment with intervals of rest is continued until from 20 to 40 injections of cypridol have been given. After the lapse of two weeks or longer a Wassermann test is made; if positive, more salvarsan is given, followed again by mercurial injections. This process is repeated until a negative blood reaction has been obtained. In these early cases, however, it is not uncommon for the test to be negative after the first course of combined arsenical and mercurial treatment. If it is negative milder therapy is then employed. I have no fixed rule in regard to the latter. The important thing to do is to keep the patient under observation and have his blood examined every few months while he is taking treatment. It is my custom to give some mercury by mouth, even though the serological test shows the disease to be inactive. Of course, all patients are not treated exactly alike; experience, judgment, and common sense on the part of the physician will enable him to work out a plan well adapted to the requirements of the individual case.

If secondary symptoms have appeared before treatment is begun, both the clinical and serological control of the disease are more difficult matters; the spirochetes have been diffused throughout the system and have already wrought a multiplicity of tissue changes. Salvarsan should be administered immediately, but it is my opinion that greater caution is required in its use than during the primary stage. Experience leads me to believe that patients do not tolerate repeated doses as well as they do before they have become toxic as a result of their generalized syphilitic infection. Moreover, the destruction of large numbers of spirochetes and the casting of their poisonous products into the circulation may overtax the patient's power of elimination even to the extent of loading him up with a fatal dose of poison. The farther advanced the secondary stage, the greater are these dangers.

Further progress of the disease means a corresponding impairment of vitality. Especially cautious should we be with patients who are ill-nourished, cachectic, more or less alcoholized, and generally below par as to health. For these reasons I have no definite chronological system for the administration of the arsenicals during the secondary stage. I give a full dose, watch the patient's reaction, wait a week or ten days to see its effect upon the lesions, and then, if there is no contraindication, give another full injection. Frequently the second injection is followed after the lapse of a week by daily intramuscular injections of mercury until the physiological action of the latter drug fully manifests itself. Then after the subsidence of these effects another injection of salvarsan or neosalvarsan is given. In some cases more than two doses of the arsenical are given before any mercury is administered, but I am so convinced of the necessity for the latter drug that I like to combine it with the salvarsan almost from the beginning of the treatment, using the two alternately until the lesions have disappeared and the blood reaction has become negative.

It is the custom of some thoroughly experienced physicians to give the arsenicals and mercurials simultaneously. I prefer, however, to use them alternately in the manner just described. In this way, by giving repeated courses of both drugs during the first few months, all active signs of the disease are controlled, its contagiousness is destroyed or very much lessened, and its progress is materially arrested. It is necessary, however, that after this treatment be continued for a period of three or more years, according to the exigencies of the case. Liberal doses of mercury by mouth can be relied upon during part of this period. I prefer the biniodide, of which the average patient can take from two-thirds of a grain to one grain a day without any disturbance. In text-books schemes for the administration of mercury by mouth are described; for example, a certain number of days during the first six

months, a certain number during the following three months, and so on. I have not found such plans at all satisfactory, and am governed by the indications in the individual case. For patients who come under treatment with well-advanced secondaries I also employ iodine in conjunction with the internal mercurial treatment, or even simultaneously with the injections, giving it either in the form of one of the chemical salts, or as an organic compound, such as iodalbin. Here, too, the rule is to give enough to produce signs of intolerance and then to stop for a while. It is given for the purpose of causing resolution of any tissue deposits that may have been formed. Throughout the three years' treatment it is well to give a few mercurial injections from time to time, and, if the Wassermann becomes positive or if recurrence has taken place, two or three intravenous injections of salvarsan or neosalvarsan should be given.

This is the way in which I am treating syphilis at present. In my hands the method has given satisfactory results. Of course, in certain cases conditions will arise which will make it advisable to deviate somewhat from the scheme herein outlined. As a control it may be well in some cases to have the reaction of the spinal fluid tested after the blood reaction has been repeatedly negative. This will necessitate a day's rest in bed, preferably in a hospital.

If it be borne in mind that in the treatment of syphilis the great desideratum is to hit the disease hard early in its evolution, at the same time realizing the potential danger of intensive arsenical treatment and exercising judgment in its application, excellent results can be obtained. The new remedy should in nowise discount the value of the older one, mercury, which should be given in liberal doses. The treatment of late syphilis, while presenting many problems of interest, does not come within the scope of this paper, and consequently will not be discussed.

THE SMALL VOLUME METHOD OF ADMINISTERING NEOSALVARSAN, ETC.

BY S. W. MOORHEAD, M.D.,

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The advantages of giving the arsenical preparations used in the treatment of syphilis in a small bulk rather than in the comparatively high dilutions formerly recommended are, from a theoretical standpoint, the lessened quantity of fluid added to the content of the cardiovascular system and a reduction in the impurities injected should there be, in spite of every precaution, a fault in the water used for the solution of the drug. From a practical standpoint the advantages are a lessening in the toxic effects of the medication, patients greatly preferring the syringe to the burette method, a reduction in the size of the needle which may be conveniently used, and greater ease of administration, the apparatus being less bulky and more easily handled.

The alleged disadvantage of the method, that the dosage is injurious when suddenly thrown into the system in a highly concentrated form, whereas it is easily borne if given well diluted and slowly, would certainly hold were the medicine injected rapidly; but given slowly, taking the precautions detailed below, the blood acts as a diluent as it flows past the point of the needle, so that so far as its contact with the body tissues is concerned, the preparation is little, if any, more concentrated than when given in large bulk, nor is its effect more sudden.

The apparatus required is a graduated mixing cylinder of 25 to 50 Cc. capacity, a receptacle into which the solution of the drug may be poured before filling the syringe, a syringe (all glass) of 10- or 20-Cc. capacity, a 22-gauge needle, and a tourniquet; and when an acid preparation is to be administered, sodium hydrate solution, a medicine dropper, a small funnel, and sterile cotton. All of the instruments should be boiled in clear water immediately before use.

When neosalvarsan is to be given a 10-Cc syringe is sufficiently large; for sal-

varsan, diarsenol, and arsenobenzol (Polyclinic) one holding 20 Cc. is to be preferred; the drug can then be dissolved in 10 Cc. freshly distilled water, neutralized, filtered through cotton, and the filter washed through with another 10 Cc. of water. Needles should be of some non-corrosive material (platinum, gold, "nickeloid"), and should be carefully ground. As a receptacle for the solution a three-and-a-half-inch "watch crystal" or a small beaker answers well. A strip of rubber dam, twelve inches long and three inches wide, makes the best tourniquet. It is tightly passed once about the arm, and fastened by tucking under a loop of one of the ends, somewhat as a sheaf of grain is secured.

The syringe being loaded, needle attached and air expelled, the tourniquet having been applied so that the maximum distention of the veins is obtained, and a watch laid on the table beside the patient's elbow, the needle is inserted into the vein, its entrance being announced by the appearance of blood in the syringe in the majority of cases; when due to the tightness of the piston in the barrel this does not occur, a gentle pull on the piston will reveal the position of the point of the needle by the appearance or non-appearance of blood. It is needless to emphasize the fact that the injection of even a few drops of the concentrated arsenical solution into the subcutaneous tissues may give rise to severe irritation. The tourniquet is removed by a gentle pull on the tucked-in end as soon as blood is seen in the syringe.

The injection is made at the rate of one cubic centimeter in twenty seconds. It may be safe to adopt a greater speed than this, but this rate has proved so satisfactory that no experiments to determine this point have been made. By resting the fingers of the left hand firmly on the patient's forearm the syringe may be held quite still; no difficulty has been experienced in keeping the needle in the vein during the injection.

After the injection is completed a little blood is drawn into the syringe to avoid the danger of leaving any of the drug in the tract of the needle as it is removed.

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THE PROVOCATIVE WASSERMANN TEST IN THE CLINICAL DIAGNOSIS OF SYPHILIS.

In the *American Journal of Syphilis* for July, 1917, STOKES and O'LEARY reach these conclusions:

1. From a study of 103 cases in which an injection of salvarsan was given to provoke a positive Wassermann after a negative test, presumptive, but not conclusive, evidence of the existence of a provocative effect was obtained.

2. A knowledge of the tendencies and limitations of the Wassermann technique employed should form a part of any study of the clinical value and interpretation of the provocative Wassermann test.

3. Such a study on a series of repeated Wassermann tests in the Mayo Clinic seemed to indicate that the tendency of the technique was conservative and against the conversion of negative into positive reaction without the administration of salvarsan.

4. It seems probable that both individual technical variations and variations in the reagents are a factor in the results in addition to the provocative effect.

5. Positive provocative effects were obtained in 18.4 per cent of 103 cases.

6. The provocative test was of value in recognizing as insufficiently treated two out of six cases (33.3 per cent) in which it was applied to determine whether a cure had been attained.

7. A strictly controlled and completely worked-out provocative procedure involves an amount of labor which makes it clinically inapplicable, and it seems probable that this same obstacle will keep it in the field of presumptive rather than conclusively demonstrated clinical phenomena for some time to come.

8. The provocative test in Stokes and O'Leary's series seemed to be of the least

service in active deep-seated visceral, osseous, and central nervous system syphilis, where it was most needed, fairly efficient (40 per cent) in latent syphilis, and most often positive in late cutaneous and mucous membrane manifestations, where the diagnosis can often be made morphologically.

9. Their results do not suggest that the provocative is entirely a Herxheimer reaction phenomenon, since local and symptomatic Herxheimer reactions occurred in their series in cases in which no provocative effect could be recognized, as well as in cases showing a provocative effect. It is possible, however, that the use of several very sensitive antigens might demonstrate an effect not detected in routine procedure.

10. A suggested procedure for provocative tests is given and seems to them to represent a compromise between the clinical impossibility of a fully controlled procedure, on the one hand, and partial and untrustworthy methods on the other. At its best the test yields a rather small return for the amount of trouble, and if overelaborate is subject to the same risk of error as the oversensitive Wassermann test.

11. Certain special indications for the provocative procedure are enumerated.

12. The percentage of cases whose syphilis was suspected from clinical examination ran parallel to the percentage shown to be syphilitic by therapeutic test, and far in advance of the number shown to be syphilitic by the provocative test.

13. The therapeutic test, properly applied to suitable cases, would seem to be of more value in clinical diagnosis of obscure syphilis than the provocative Wassermann test.

14. Positive therapeutic effects were obtained in 63.1 per cent of thirty-eight cases and in 65.2 per cent of twenty-three cases in which the provocative test had failed to establish the presence of syphilis.

15. The provocative Wassermann would seem to be of little value in the absence of clinical evidence of the disease, and to be inferior both to clinical judgment and the therapeutic test in the recognition of obscure cases.

EDITORIAL.

DIRECT TRANSFUSION OF BLOOD.

Although direct or indirect transfusion of blood was resorted to comparatively early in the history of modern medicine, nevertheless it did not gain favor, probably because in a certain number of cases the blood of the donor produced hemolysis in the blood of the donee, and at that time hemolysis was not recognized and methods of determining that it would occur in a given donee had not been developed. With the advances which have been made in our knowledge of the blood it can easily be determined beforehand whether the blood of the donor will agree with the blood of the donee, and thereby transfusion has been changed from being a haphazard or dangerous procedure into one which is often exceedingly valuable and very rarely followed by disagreeable results. One of the other difficulties which has stood in the way of its being resorted to frequently has been the belief that certain complicated forms of apparatus and cannulas had to be employed, but increasing practice and experience is constantly simplifying these methods of procedure. We have, on the one hand, the employment of citrated blood, which is an indirect method not to be discussed in this article, and the direct transfusion by means of tubes. Some of these tubes have been difficult to handle and require great dexterity in their use. The employment of a paraffin coating to prevent coagulation of blood has done much to render the method possible.

Not only is direct transfusion of the greatest possible use in many cases of hemorrhage and in secondary anemia, due to sepsis or intestinal parasitism, but it is also useful in combating shock, particularly if shock is associated with hemorrhage, as after severe wounds and injuries. Fullerton, an English surgeon, Dreyer, Professor of Pathology in the University of Oxford, and Bazett, Captain, Royal Army Medical Corps, discussed this matter in an article con-

tributed to the London *Lancet* of May 12, 1917. They insist upon its value when all methods of resuscitation have threatened to fail, and state that they have seen patients who were blanched and shocked brought back to life in a most astonishing way. They recognize that it has its limitations and do not recommend its indiscriminate use. They point out that after a rapid and moderately severe hemorrhage, the main indication is to administer fluid, and that this can quite readily be accomplished by the introduction of saline solution into the circulation. If the hemorrhage has been very severe, or recurrent, so that the hemoglobin content of the blood is at a level insufficient to maintain life—for example, in the neighborhood of twenty per cent—transfusion is imperatively indicated, and even if it is as high as thirty per cent it is still indicated. A percentage of forty appears to be sufficient to carry on full oxidation in a patient at rest, but if there is accompanying sepsis undermining vitality then in such a case transfusion may be advantageous. These writers, while recognizing the importance of excluding syphilis and other infectious diseases in the case of the donor, state that they have not considered it necessary to examine the compatibility of the donor's blood with that of the donee. This seems to us to be taking a risk which is unnecessary, but they add that in sepsis hemolysis and agglutination often take place, and therefore the test may be unreliable. They quote American writers as expressing the view that the risks of a fatal result from transfusion do not exceed one or two per cent, even if the donor is not related to the recipient.

The method which they employ consists in two glass or silver cannulæ, connected by a short length of about seven inches of india-rubber tubing, the whole being coated within and without by a thin layer of wax made by mixing hard and soft paraffin. They use thin-walled, transparent india-rubber tubing which will stand heat and

which will allow pulsations to be easily felt. The paraffin mixture consists in about equal parts of hard and soft paraffin, or in such parts or proportions as to set at a temperature of forty-three to forty-eight degrees centigrade, the optimum being about forty-five degrees. This mixture may be used again and again, as may the rubber tubing, but usually it is best to employ fresh tubing. The coating is effected by immersing the apparatus in the paraffin mixture in a water-bath at a temperature of 130 degrees centigrade, which also sterilizes the instrument. Care is taken to see that the cannula and tubes are filled with the mixture without air bubbles. They are then held in a vertical position so that the fluid is allowed to run out of the larger cannula, which will ultimately be inserted in a vein, and the last drops are removed by drawing the end of the dependent cannula lightly across sterile gauze. The coating is allowed to set, and then placed in a sterile wrapping ready for use in a sterile test-tube carefully plugged. Each cannula should have a shoulder in order that when introduced into a vessel it may be held there by ligation, and each cannula should have a bevel point. The donor and donee being placed side by side, the smaller cannula is inserted into the radial artery, and the larger cannula, with its connecting tube, into one of the veins of the elbow. It is best for two operators to perform the operation, one exposing the vein and the other the artery. Before the vessels are opened hemorrhage should be prevented by means of light bulldog forceps. The tubes being in place the forceps on the artery are released for a moment to allow the apparatus to fill with blood to expel air; the forceps are then replaced on the artery and the vein cannula introduced and tied in place. Both forceps are then removed and the blood allowed to flow, when pulsation can be readily felt in the tube. The quantity of blood varied from 600 to 1000 Cc.—that is, approximately from a pint to a quart. If the donor feels faint the operation should be stopped. The symptoms in

the donee that call for a cessation of transfusion are chill, precordial pain, increase in pulse-rate, and failure to improve in color.

The obvious disadvantage of the method we have just described is that the authors recommend, and we do not see how it can be avoided, the ligation of the artery and the vein after the operation to prevent hemorrhage. This, of course, cuts out an important vascular supply and to some extent interferes with the repetition of the transfusion if it is needed.

This method of direct transfusion seems to be about as simple and efficient as any yet devised and ought to be readily accomplished by any one who has done vascular work. From personal experience we would recommend that care be taken in the drawing of the glass cannulae that the glass is properly annealed or tempered. In heating the ends of the glass tubes for the purpose of shaping them the glass is often made exceedingly brittle and fragile and breaks when exposed to heat or on light handling. If it breaks when in the blood-vessel it greatly complicates the operation, as the particle has to be removed and the endothelial lining of the vessel is injured, whereby clotting readily occurs. The writers we quote, in their article, give records of sixteen cases, and conclude that it is a most favorable measure.

ON METHODS OF ADMINISTERING ANTITETANIC SERUM.

We confess that we had thought this question had been pretty well determined until we read in the London *Lancet* of May 5, 1917, a series of articles upon this important subject. The first of these is a report on twenty-five cases of tetanus made by Dean. In this report it is stated that the majority of the patients had been wounded in France, and that it is probable that almost all, if not all, had received prophylactic injections before leaving that country. In all instances the wound had been at one time or another septic, but in nine of the cases it had healed or practically

healed at the time of onset. In thirteen cases the wounds had been of a severe nature, causing considerable laceration; in four they were quite superficial; in one case tetanus followed in two weeks after amputation of what appeared to be a perfectly clean stump. In other words, five of the twenty-five cases of wounds were of such a nature that it is improbable that the most conscientious medical officer would have selected these men for further prophylactic injections. It is evident that the administration of prophylactic injections to every wounded soldier after his arrival will materially diminish incidence of the disease. Dean also points out that of greater value as an indication for the administration of prophylactic injection than the mere extent of the wound or the amount of the discharge is the presence of a foreign body or the existence of a compound fracture. There was a compound fracture in eleven of the twenty-five cases referred to, in two a leg had been amputated, and in seven there was a history of removal of a bullet or fragment of shell. In at least two cases the foreign body was still in the tissues at the time of the onset of tetanus.

When prophylactic doses of tetanus antitoxin failed to prevent the disease, nevertheless they profoundly altered its course. Thus, in the twenty-five cases referred to the incubation period from the original date of the wound exceeded fifty days, and in only two cases did signs of tetanus develop within ten days of the date of the operation. In other words, prophylactic doses caused marked prolongation of the incubation period. Such doses prolong the rate of onset so that it is continued over a period of days or even weeks. And this is advantageous in that it permits the disease to be recognized and actively treated before it becomes severe. On the other hand, the very slowness of development is in itself insidious and may puzzle the physician.

In ordinary cases the muscles most frequently involved appear to be the masseters, the posterior cervical muscles, the muscles of the anterior abdominal wall, the spinal

muscles, those of the lumbar region, and the flexors of the hip, knee, and ankle. Out of the twenty-five cases referred to by Dean, in four the spasm remained localized in the neighborhood of the wound, in ten it commenced in the neighborhood of the wound and gradually produced general involvement, in eleven there was no history of preliminary local spasm and the disease commenced suddenly by involvement of the jaw and neck muscles.

Dean gives careful consideration to the results obtained by different methods of injection. He thinks that in very mild cases intramuscular injections are quite sufficient, using 10,000 units, followed at three-day intervals by a second and third dose of 5000 units. When the cases are severe, however, intravenous injections are much to be preferred, 30,000 units, varying in bulk from 120 to 190 Cc., being given intravenously. Intraspinal injections were also used in severe cases, supplemented by intravenous and intramuscular injections. Dean does not think that it is necessary to give injections at frequent intervals until every sign of tetanus has disappeared. He warns against a diagnosis of rheumatism or muscular rheumatism being made in the early stages.

Dean's statistics show that of five mild cases treated by intramuscular injections five recovered; that of fourteen treated by intravenous injections thirteen recovered; and that of five treated by intraspinal injections three recovered. But this does not mean that the intraspinal method is feeble, but rather that the conditions met were more desperate.

In another paper upon this subject contributed by Sir David Bruce to the same journal of the same date, upon "Intramuscular versus Intraspinal Injections," he strongly insists upon the manifest superiority of the spinal route over the muscular route. According to his experiments, which were made upon animals, out of twelve animals treated intramuscularly all died, but of eighteen animals treated intraspinally thirteen recovered.

In still a third paper by Andrewes, he says, in concluding his communication, that his object in writing has been to confirm the faith of those who believe in the intraspinal route in face of doubts which have recently been cast upon its value. He believes that the risks are less and the prospects of cure greater when the intraspinal route is chosen in preference to the intravenous route, and that the loss of time suffered in the absorption of the antitoxin when it is administered intramuscularly is a loss of precious time which may cause the loss of a life.

Then we have another paper by Golla, in which he makes reports of experiments upon animals to determine this question. He emphasizes the fact that the War Office Committee for the Study of Tetanus has insisted upon the advantage of intraspinal treatment, and states that his experiments upon animals show the indubitable superiority of the intravenous and the intraspinal routes over the subcutaneous.

Finally, Gow reports a case of tetanus treated by combined intraspinal and intramuscular injections, but noteworthy in that injections were made high up in the dorsal region because the arm was the principal site of spasm. Five thousand units were injected in the lumbar region at first, and 10,000 were given intramuscularly. Seven hours later the patient was worse, and on the next day an injection of 4500 units was made between the first and second dorsal vertebræ, a similar quantity of cerebrospinal fluid being first withdrawn. It is interesting to note that this spinal fluid was found to contain some of the antitoxin injected on the previous day. On each succeeding day for five or six days 5000 units were injected intramuscularly. On the sixth day of the injection, a second injection between the first and second dorsal vertebræ was given. The patient then rapidly recovered.

From all of which it would appear that, face to face with tetanus, it is probably wise to give it intraspinally, intravenously, and intramuscularly, and to rely upon intra-

spinal injections in direct proportion to the severity of the symptoms.

If it be true that tetanus toxin travels along the axis-cylinder of the nerve from the infected point, early intraperineural injections would also seem wise.

In collecting statistics in regard to the efficiency of any method of treating tetanus, it is not to be forgotten that these cases are divisible into practically three classes: Fulminant cases in which the patient dies within a few hours, even if every avenue of entrance for antitoxin is utilized; moderate cases in which the antitoxin will save a large proportion; and the chronic cases, of which a fairly large percentage recover even without antitoxin. The latter type of case may cause statistics which seem to possess value to contain a large factor of error.

THE CALCIUM CONTENT OF THE BLOOD.

We have again and again pointed out in these pages that there is no tissue of the body in which nature maintains so constant a composition as that of the blood. The introduction into it of any foreign substance at once calls into activity various methods of elimination, or destruction, which are utilized in an effort to get rid of it, and even when substances which are normally present in the blood are introduced in quantities in excess of those which are usually present, again every effort seems to be made by the body to immediately establish a normal tonicity or quantity. If any of the usual salts of the blood are injected into the blood-vessels, either the kidneys get rid of the excess material, or the blood draws from the fluids of the body a sufficient amount of liquid to dilute the injected salts so that their concentration is physiological. If anything is done which interferes with either of these processes, salts, which ordinarily are present and innocuous, immediately become poisonous. This is well illustrated if the potassium salts are taken when the function

of the kidneys is impaired. A man with healthy kidneys can take large quantities of potassium salts with impunity, but if his kidneys cannot promptly eliminate the potassium salts symptoms of poisoning from these salts soon appear.

In this connection we find of interest a communication which has recently been published by Halverson, Mohler, and Bergeim upon "The Calcium Content of the Blood." Other investigations have shown that the calcium content is remarkably constant. The investigators whom we quote studied the blood of human beings in different stages of pulmonary tuberculosis, and have reached identical results, finding that even when a diet rich in calcium is administered the calcium content of the blood, both in the sick and in the well, ranges between 9 and 11 milligrammes per cent., the amount usually found, however, being 10.5 milligrammes per cent. Even in conditions when the kidneys are diseased, and uremia is present, it has been shown by Lyman that the calcium is not increased, and, notwithstanding the theories which were advanced some years ago, chiefly by Wright, that in hemophilia and purpura the calcium salts would prove useful therapeutic agents in that they would overcome the paucity of this substance in the blood, it would appear that in these diseases there is not a real paucity, although the amount of calcium may be about 75 per cent of that which Halverson, Mohler, and Bergeim found to be present. It is pointed out by these three investigators that a man weighing about 150 pounds has in the total volume of his blood only about 0.3 of calcium, although the bones contain four thousand times this quantity. From this great reservoir of calcium the system, therefore, should be able at all times to obtain the infinitesimal amounts which are necessary to maintain the normal calcium content of the blood. This probably accounts for the constancy of content which had been found, and raises a grave doubt as to whether the administration of calcium salts by the mouth or hypodermically is of

much value. Such a doubt has been raised by clinicians who, following Wright, have employed the calcium salts in cases in which the coagulation time of the blood was materially prolonged. To such an extent is this true that we think it may be fairly stated that whereas a few years ago, subsequent to the publication of Wright's papers, calcium chloride or lactate was often given, recently such a plan of treatment has almost dropped out of sight. Possibly the discovery on the part of clinicians that they did no good is explained by the results of Halverson, Mohler, and Bergeim.

THE CARE OF VENEREAL DISEASES IN THE ARMY.

Based on the experience of all wars, to which this one may be no exception, a major cause of individual crippling has been from venereal diseases, usually temporary, occasionally permanent. Against the large incidence of this a well-organized campaign has been formulated, based on, first, instruction as to the dangers incident to contraction of these diseases; second, on recreation, by which the soldier's leisure time may be pleasantly occupied; third, on hygienic supervision of the regions environing the great cantonments, by means of which promiscuous sexual approach may be rendered difficult or impossible and sources of infection when discovered may be removed.

None of these measures will prove largely efficient unless the health authorities take this opportunity for inaugurating that campaign against syphilis and gonorrhea for want of which these diseases remain unchecked. If in every State of the Union syphilis and gonorrhea are made reportable diseases, and if the rights of the individual suffering from either or both are as completely disregarded as they would be in case they were infected by scarlet fever, the first real step toward eradication will have been made. This implies not merely reporting and supervision, but provision for sequestration of infected foci.

The army discipline is such that it is difficult, indeed well-nigh impossible, providing regulations for examination are efficiently carried out, for a man venereally infected to conceal it. If each infected man names the source of his infection, and if this source is promptly supervised or taken in charge, it is obvious that an infected female, or indeed any female, will be as loath to confer upon the soldier her favor as is the barkeeper of to-day to give him a drink while in uniform.

Nor would such measures excite large opposition, nor has the time ever been more ripe for them than at present.

Since courage may be lacking to even attempt this very large sanitary reform there must be provision, and very large provision, made for the treatment and prompt return to duty of the venereally infected soldier. Indeed, it is well recognized that the establishment of venereal units of a general hospital will be needful, nor is the method of procedure at the General Hospital of Alexandria (*Journal of the Royal Army Medical Corps*, July, 1917) without its useful lessons.

As to the staff, one medical officer is detailed for every hundred patients, with about six orderlies, including cooks, clerks, pack store, linen store, and sanitary men. Moreover, six laborers are employed for the most disagreeable part of the work. There is a building divided into two parts containing the latrines, ablution benches, and baths; one patronized by the syphilitics, the other by those suffering from gonorrhea. The wash is done in the general laundry, and the clothing is all steam-sterilized before being sent to be washed. The Red Cross provides a recreation hut, and all dressings are done in dressing-rooms. It is noted that because of instruction in the subject men apply very early for treatment. The syphilis diagnosis is made by the microscope; where antiseptics have been applied to the wound a simple dressing is put on for a week, and the microscope is then used. Later the Wassermann test is relied on. Gonococci of course are

identified at once. Most of the cases are recurrent ones.

The dressing of the chancre is a simple mercurial one. The patient is given an antiseptic tooth powder, instructed how to use it, and general treatment by salvarsan and mercury. In early cases two doses of salvarsan (each 0.1 gramme) are given with an interval of at least fourteen days between them. In the secondary stage three doses are given. Patients unfit for full dose are given smaller ones, the total quantity being about the same. Before giving salvarsan the patient is purged the night before, and put on milk diet for twelve hours before and twenty-four hours after the injection. The solution is prepared as usual, 250 cubic centimeters being given. After the injection the patient is kept in bed until the following morning. Some cases of rising temperature with vomiting and diarrhea are recorded, and some of erythema and urticarial lesions.

In addition the patients are given 9 grains of mercury intramuscularly, either as six weekly injections of $1\frac{1}{2}$ grains or nine weekly injections of 1 grain, or a mixture of these doses according to the weight of the patient and the tolerance he shows for the drug. Gray oil is employed, the injection being made deep into the upper part of the gluteal muscles. In some cases gingivitis followed this treatment, and in some slight nephritis. Cardiac dilatation with marked tachycardia in two cases was so pronounced as to be distinctly dangerous. The condition in both cases came on suddenly, and in neither case could other signs of mercurialism be detected. Some complained of headache and fever after injection of one grain. Inunctions were therefore used in these cases.

As soon as a man has had two salvarsan injections and three injections of mercury he is discharged from the hospital for light duty, returning to camp every Friday morning for treatment until the completion of his course of mercury. The medical officer always looks at the mouths and excuses

those who are salivated. He examines all the urines, admitting those with albumen.

As to gonorrhea, the men are kept in bed on a milk diet during the acute stage, then get up with ordinary diet which contains meat. Drugs are not much used. All patients are irrigated from the day of admission one to three times daily, according to necessity, 1:10,000 potassium permanganate being employed warm. Each patient is trained to do his own irrigating. An irrigating room containing eighteen stalls, each of which is fitted up with an ordinary douche-can hanging six feet six inches from the ground, rubber tubing with stop-cock, a water-proof apron, and a small wooden stool are provided. The patients are paraded outside the room. Eighteen men go in and each takes a douche-can from a stall. Each fills this with warm water, and then goes to the orderly, who puts in the requisite amount of potassium permanganate, and hands to the patient a sterilized nozzle. The patient takes it out to the stall, fills up the douche-can and irrigates. When he finishes he detaches the nozzle from the rubber tubing and hands it to the orderly for sterilization. He then gets a urethral injection of mixed zinc sulphate or other astringent or anti-septic, according to the state of his disease and the fancy of his medical officer. Men who fail to attend for irrigation are punished. Prostatic massage is carried out in cases suffering from subacute or chronic posterior urethritis. It is highly spoken of. Obstinate subacute and chronic cases are treated with vaccines.

As to the test of cure, the patient who has been free from discharge for two days is ordered to hold his morning urine till the medical officer, or the assistant ward master, sends for him to pass it in the urine testing room. If the urine is free from threads or "floaters" he is ordered to repeat this in two days. If this second specimen is satisfactory he is discharged. If the first specimen is not free from threads he is put back on treatment for a few days, and if still free from discharge has another

attempt to pass what he calls a "water test." Cases of gleet who suffer from an early morning bead are treated with irrigations, massage, vaccines, etc., but, if the case is one of long standing, they do not insist on a cessation of discharge as a proof of clinical cure. These patients have their prostates vigorously massaged and a smear made of the resulting secretions. If no gonococci are found the patient is sent out to duty.

As to soft chancres, the best results are obtained by ionizing the sore with 1:1000 bichloride solution, and if it is indolent, stimulating it with ten grains zinc sulphate solution to the ounce.

The average period in the hospital is 39 days for syphilis, 34 days for gonorrhea, 30 days for soft chancre.

This contribution represents a practical organization, probably very similar to that which will be adopted by our own medical officers. Concerning the remedies used in syphilis there will be no difference. There may be a distinct variation, however, as to the dosage and intervals between doses. As to the method of procedure to be adopted in the case of gonorrhea, its possible variants are so great that speculation is likely to be fruitless.

A vigorous national and international policy would so diminish the number of cases as to make many special hospitals unnecessary.

TREATMENT OF WOUNDS OF THE KNEE IN WAR.

The enormous experience of this war should by this time have definitely indicated the line of treatment which is most serviceable and helpful in all lacerated and contused and infected wounds. In the minds of some observers, but by no means all, this end has been accomplished, and the Carrel-Dakin treatment has been that which has saved more lives and limbs and lessened mutilation more markedly than any other surgical procedure. Perhaps no treatment could have a more crucial trial than that

incident to wounds involving the knee-joint, concerning which and their management surgeons even before the war were by no means in accord. In the beginning of the present war Berard (*Revue de Chirurgie*, November and December, 1916, published in June, 1917) notes that the semi-official directions concerning wounds of the knee were to the effect that they should be treated conservatively. The first dressing having been applied and the part immobilized the patient should be sent to the rear, where operation should be performed only in cases of virulent infection.

This teaching doubtless was based in part upon previous military experience in which bullet wounds formed 90 per cent of cases as opposed to the 10 or 15 per cent of such wounds in the present war. Moreover, it is probable that many of these wounded patients were not carefully followed up, and final provisions were not made for thorough surgical treatment. Berard states that even at the beginning of the war he and his colleagues practiced large and early arthrotomies and methodical resections when the knee-joint was heavily infected, followed by immobilization. When these formal surgical procedures were practiced promptly before the infection was wide-spread, the devitalized tissues being cut away and the foreign bodies removed, the results were so much better following such prompt surgical procedure than when infections were well established, and this not only in regard to the knee, but concerning all infected wounds, that all armies now fighting at the front have made provision for this prompt surgical service and as near the firing line as is practicable.

In 1915 Delore with Kocher advocated cleansing the synovial cavity of the joint with ether or artificial serum, curettage of cartilaginous and osseous erosions, and closure of the synovial cavity without drainage, excluding as far as this was possible, by sewing or gauze packing, those articular surfaces which had been seriously injured as well as the damaged surrounding soft parts; all devitalized tissue being re-

moved by scissors or the knife. In practice this teaching has been generally accepted. Gaudier in particular insisted upon the most careful removal of all tissues injured by the passage of a projectile, including skin, muscular tissue, and aponeurosis, making this dissection as carefully as he would if he were removing a tumor, paying particular attention to accurate hemostasis. Thereafter the raw surfaces are united by deep sutures and an effort made to secure immediate healing.

In classifying wounds of the knee, aside from those huge mutilations which indicate amputation, Berard alludes to the injury which he calls a seton, produced by a conical rifle bullet from a distance of 400 or 500 yards, not exhibiting an explosive effect and passing through, the wounds of entrance and exit being much alike. There is an immediate bloody effusion into the joint, causing in a few hours characteristic globular swelling, a little pain at first, with great disability. These cases run an entirely favorable course, though not always, since gas gangrene at times develops. It would seem wise to practice at once excision of the devitalized skin at the point of entrance and exit of the bullet, and also excision of the entire tract of the ball by means of an arthrotomy, which thus enables the joint to be evacuated of its contained blood. When this perforating wound is due to a deformed or a glancing ball or a fragment of shell the danger of infection becomes very much greater. Pieces of filthy clothing are often carried in with the missile. The wound of entrance is large and irregular, the wound of exit often torn. The operator should always regard it as infected and likely to lead to gangrenous and septic complications. There should be hemostasis, cleansing of the synovial cavity, and excision of all devitalized tissues. Balls which lodge in the joint without traversing it, though they may heal under conservative treatment, should be removed at once. Even though they are not deformed balls, fragments of shells or bombs always imply infection, and here the need for immediate surgical opera-

tion is imperative. The infections include staphylococcus, streptococcus, enterococcus, pyocyaneus refringens, bacillus of Nicolaier, and the vibriion septique, together with many others.

The actual injuries of the joint vary from slight abrasion of the cartilaginous surface to extensive comminuted fractures of the patella, condyles of the femur, and the articular extremity of the tibia. The treatment of these more extensive injuries is removal of cartilage and bones which are three-fourths free, together with all injured surrounding soft tissues, often implying a long and tedious dissection. Thereafter the synovial cavity is closed and the divided tendons sutured. If after this operation there is left a distinct cavity, resection would seem to be indicated; this without drainage if the damaged soft parts have been carefully dissected away. Berard strongly advises against unicondylar resection or removal of either the femoral or tibial epiphyses, instead of both, because of ultimate lessened function if this is done. Concerning the chemical disinfection after operation it is recognized that there is a period following the introduction of microbes by a foreign body in which they increase slowly. This lasts for from six to twelve hours and is called by Berard the preinfectious stage. It is possible almost certainly to totally disinfect a traumatized area by resecting the wound tract. Mechanical disinfection is possible of accomplishment in thirty-six hours and has been reported as long after the wound as sixty hours. As opposed to this, very simple penetrating wounds will at times develop acute gangrene in less than thirty-six hours.

Gregoire reported to the Surgical Society in January, 1917, that he had treated 102 cases of wound of the knee with but a single death. There were two amputations, four resections, and 96 radical treatments with closure, giving four failures and 92 successes. In 17 of 29 cases the fluid drawn from the articulation gave anaerobic cultures. In these 29 cases cultures made from the foreign bodies were always posi-

tive, usually containing perfringens and streptococci. Mocquot and Monod in 144 cases of wound of the knee report eight deaths. Of those cured 106 were incident to conservative treatment or conservative intervention, 35 followed primary or secondary resection, and 5 amputations.

The general feeling then in regard to wounds of the knee is that they should be opened freely, thoroughly cleansed by mechanical removal of devitalized parts, the synovia of the cavity should be closed, and the part should be immobilized and treated, and watched by the surgeon who performs the operation for at least two or three weeks, when mobilization may begin. As to the ultimate results of this treatment statistics are not available. It is quite certain that some cases are cured and often regain strong and painless knee-joints. Thus Mariche reports concerning 32 prompt arthrotomies that 20 had practically ankylosed, and only one had complete restoration of function. These arthrotomies were performed through a U-shaped flap, which, of course, involved cutting the patellar ligament. Eight lateral arthrotomies gave very much better results. Of three cases with extensive bone wound in which there had been prompt arthrotomy with curettement, but not resection, one had to be again arthrotomized and drained and two others submitted to difficult resections.

Berard speaks strongly in favor of the Carrel-Dakin method as especially applicable to the osteoarticular lesions with blood flowing into the cavity from comminuted fracture. Statistics are recited concerning 113 patients who presented perforated wound of the knee either without bone lesion or with one that was very slight. The wounds of entrance and exit were treated by tincture of iodine. The joint effusion was drawn off, pressure dressing was applied, and the joint was immobilized. All recovered rapidly with complete restoration of movement. Eighty-three cases of more serious wound were treated in divers

ways. At first in December, 1914, to September, 1915, after toilet of the wounded tissues the articulation was drained, the joint then being immobilized. The dressing was changed every day, with various antiseptic irrigations. Of twelve cases of moderate severity, two recovered promptly and one with preservation of movement. Five recovered with ankylosis and five were amputated, one dying of septicemia. Of thirteen with rather extensive articular injury, two got well without suppuration and with fairly free movement. Ten suppurated, and of these six were amputated, with three deaths. In the second period, September, 1915, to July, 1916, the Carrel method was applied in every case after free opening of the articulation. In twenty-six cases in which the bony lesion was trifling there were fifteen cures with complete restoration of movement, two cases of ankylosis without suppuration, and nine suppurations of the articulation. One died of septicemia following amputation. There were four amputations following resection. In those seriously wounded three got well

without suppuration after removal of fragments of bone. Three got well after deep resection. In the third and most recent period 22 wounds of the knee were treated by free excision of all the injured tissue, arthrotomy and irrigation with either Dakin or ether, the tissue being closed by immediate suture, but draining for twenty-four hours; immobilized for ten days, then passive motion; at the end of fifteen days methodical mobilization. In 22 cases 19 got well with movement, three after resection; none died and none were amputated. These figures seem to show that the treatment to be regarded as standard is that of immediate surgical intervention, complete removal of all badly damaged tissue, including bone, cartilage, and soft parts, and twenty-four hours drain from the closed synovia, excepting in those cases in which the firm cartilage had not been injured.

Concerning war wounds of the knee which are freely suppurating, free arthrotomy is advised, followed by the Carrel-Dakin treatment and extension. To this the author gives unqualified praise.

REPORTS ON THERAPEUTIC PROGRESS.

THE INFLUENCE OF THYROID FEEDING UPON CARBOHYDRATE METABOLISM.

To the *American Journal of Physiology* for July, 1917, KURIYAMA reports his work on this subject. He states that fresh thyroid gland of pigs or desiccated thyroid (Parke, Davis & Company) administered by mouth in doses of 3 to 5 grammes (fresh) or 0.5 to 1.7 grammes (desiccated) per day, decreased the glycogen content of the liver of white rats distinctly in three to five days. Control animals, fed on the same diet with the addition of muscle tissue or egg, do not show any such change, even when the food amount is regulated so that they lose as much in body weight as the thyroid-fed animals.

The influence of thyroid feeding upon

liver glycogen can be very easily removed by omitting thyroid from the diet. The liver shows its normal glycogen content two or three days after the cessation of thyroid administration, even when the loss of body weight has not been regained. This phenomenon seems to show that the changes resulting from thyroid feeding and causing the loss of liver glycogen are not of a serious morphological nature.

When dextrose is introduced parenterally to fasted rats which show a very low glycogen content of the liver, the amount of liver glycogen increases markedly in a few hours. This does not seem to be the case in the thyroid-fed rats.

Experimental hyperthyroidism does not change the sugar content of the blood in either rats or rabbits.

Spontaneous glycosuria does not result from thyroid feeding in either rats or rabbits.

The tolerance of thyroid-fed rabbits for dextrose, parenterally administered, does not differ from that of normal animals.

Nearly the same degree of hyperglycemia and glycosuria can be induced by adrenalin injection in thyroid-fed as in control rabbits.

The adrenal gland of thyroid-fed rats contains approximately the same amount of adrenalin as that of normal animals.

SYPHILIS AND PREGNANCY.

THOM in the *Medical Record* of July 7, 1917, states that syphilis in the pregnant woman should be treated as it is when it occurs in others. That is, salvarsan, mercury, and potassium iodide should be exhibited sufficiently and properly to cure the disease. In the treatment of pregnant women, however, there are certain refinements which should be observed in order to attain the best results for the mother and her unborn child.

In giving salvarsan it must be remembered that the drug has been known to cause premature expulsion of the fetus; but in Thom's opinion this danger is remote. If the woman's veins are sufficiently prominent the salvarsan should be administered intravenously, unless she is suffering with myocarditis or if her blood-pressure is abnormally high. If her veins are not prominent enough and for the other causes mentioned the salvarsan may be given by the rectum. A saline is given, and after the bowels have moved the lower bowel is thoroughly cleaned with a normal saline enema; after which the salvarsan solution is allowed to flow into the rectum through a catheter attached to a glass funnel. This method, while not much used, is, in Thom's opinion, almost as efficacious as when the drug is injected intravenously. It has the advantage of not increasing the blood-pressure, does not produce "water sickness," and is much easier to give to a nervous patient. Should the woman be threat-

ened with eclampsia, salvarsan and mercury should be withheld until the urine is free from albumin.

Thom does not advise intramuscular injections of insoluble mercurials, such as the salicylate or gray oil, in pregnant women—or in any woman for that matter. His reason for this is that when such a menstruum is injected into the buttocks the layer of fat prevents its absorption and painful abscesses are prone to occur. If the patient's veins will permit he prefers to inject the mercury intravenously. A solution of bichloride, or mercury benzoate, is prepared so that each ten minims represents 0.006 of the drug. The initial dose is ten minims in 15 Cc. of warm normal salt solution. The procedure is the same as when salvarsan is given, only that the blood is allowed to run into the syringe and mix with the solution before it is injected. By so doing the chemical combination which thus occurs renders the solution non-irritating and the danger of phlebitis is avoided. When properly done absolutely no ill effects are produced (which cannot be said when horse serum is used), and it is the most efficient and promptly acting method of introducing the medication into the system. The patient should receive two injections a week for six weeks. Treatment should then cease for a month and then be renewed.

If it is not possible to give mercury this way the next best way is by inunction. During the course of her pregnancy the woman should receive from sixty to ninety inunctions; each thirty inunctions from four to six weeks apart. In giving inunctions it is best to give one each day for six successive days, and then rest the patient a day, on which a hot bath is taken. Thom is in the habit of giving potassium iodide during the course of mercury and for a week or two thereafter, as it assists in eliminating the mercury, and as mercury acts best in a state of flux, *i.e.*, while being eliminated, the maximum effect is thus obtained. Patients under mercurial treatment should rinse the mouth several times a day as a guard against stomatitis. As pregnant

women sometimes have trouble with their teeth the services of the dentist should be requisitioned if necessary. Rest and a tranquil state of mind should be encouraged. The last the medical attendant can materially aid in by maintaining an optimistic outlook. The bowels should be cared for by the administration of a mild aperient as occasion requires. Sexual intercourse should be forbidden after the third month. In those cases in which it is not possible to give inunctions, the mercury may be administered by means of suppositories.

These patients require no other treatment, the mercury and salvarsan being sufficient to overcome any anemia that may be present. In some instances a bitter tonic may be given to improve the appetite. Treatment should be persistent; careless, casual treatment is, in Thom's opinion, almost as bad as none at all.

LEAD POISONING IN CHILDREN, WITH ESPECIAL REFERENCE TO LEAD AS A CAUSE OF CONVULSIONS.

BLACKFAN in the *American Journal of the Medical Sciences* for June, 1917, says he wishes to urge that energetic prophylactic measures be taken with children who habitually eat painted articles in order to guard against the development of lead poisoning. Since his attention has been directed to lead poisoning he has found a number of children who nibble the white paint from enameled cribs.

In all patients with convulsions in which the etiological factor is not clear, lead should be suspected. This can be readily determined, as in the majority of instances there are other evidences of the condition—*e.g.*, the lead line, basophilic degeneration, and the presence of lead in the feces.

The examination of the spinal fluid may prove to be an index as to the seriousness of the affection and of prognostic aid. In three of the four patients changes were found. In one patient changes were present in the spinal fluid for many months, and the patient eventually succumbed. In another patient who has recovered, and in

whom the convulsions were not severe, the spinal fluid could not be examined at the time of the convulsions. Four weeks later the spinal fluid contained twelve cells and the globulin reaction was normal.

PYLOROSPASM IN INFANTS.

In the *Journal-Lancet* of July 1, 1917, SEDGWICK ably discusses this subject and expresses the belief that breast milk should be given in every case. It can always be obtained, and every severe case in his series received it. Buttermilk and buttermilk mixtures are valuable adjuvants.

Dehydration must be avoided. This can be accomplished by enteroclysis, hypodermoclysis, and tube-feeding. Baby K. entered the hospital dehydrated, weighing 2100 gms. After two and one-half days it weighed 2700 gms., having gained 600 gms., or 20 ounces. This was accomplished by enteroclysis and tube-feeding.

External heat must be carefully used. The heat-regulation of these infants is often very poor.

Gastric lavage was found to be of definite value, especially when followed by gavage. Longer intervals of feeding (three- and even four-hour intervals) gave the best results. At times chloral hydrate by rectum in large doses was of decided value. Stimulation, usually camphor given hypodermically, tides the infant over at times. Efficient nursing is absolutely necessary in severe cases.

Ibrahim has summed up the question of operation as follows:

1. Many cases may be cured by operation, and remain well.

2. Not only those which are to be considered as pure spasm, but also those with the most severe clinical picture which show also upon autopsy later that there is genuine hypertrophy, may frequently be cured by internal treatment and remain well.

3. It is absolutely not necessary, so far as the treatment is concerned, to make a definite distinction. The palpability of the pylorus, which is so often considered a criterion, cannot be used as an indication

for operation. Sedgwick has collected twenty-nine cases in which the tumor of the pylorus palpated distinctly, and yet they recovered completely by internal treatment.

Ibrahim has collected the following statistics:

Mortality of all cases treated internally (232), 46.1 per cent.

Mortality of those in Germany treated internally (83), 22.9 per cent.

Mortality of Heubner's cases treated internally (21), 9.5 per cent.

Mortality of all operative cases (138), 54.3 per cent.

Scudder's report included seventeen cases upon which he operated, with three deaths, a mortality of 17.6 per cent.

In conclusion, operative treatment under the very best conditions gives a low mortality. Operative treatment under unfavorable conditions gives a very high mortality. Internal treatment under the best conditions gives a lower mortality. Internal treatment under improper conditions gives a high mortality. Proper internal treatment supported by proper operative treatment in selected cases gives the lowest mortality. The later results in cases under internal treatment, as well as operative treatment, are excellent.

FURTHER STUDIES ON THE EFFECT OF ADRENALIN UPON MUSCULAR FATIGUE.

GRUBER in the *American Journal of Physiology* of July 1, 1917, says that in the fatigued unaltered nerve muscle adrenalin may increase the height of muscular contraction by a twofold action, by improvement of the blood supply (vasodilatation) and by its chemical action upon some substance in the muscle.

In a muscle in which the nerve is cut and stimulated, adrenalin in small doses, however administered, does not better the circulation and must therefore produce its effect of increasing the height of muscular contraction by its chemical (specific) action alone.

The following three processes which nor-

mally go on in the muscle may be greatly accelerated by adrenalin, and it is not improbable that one or all of these will finally prove to be the way in which adrenalin produces its effects:

1. The conversion of glycogen into sugar.
2. The reconversion of lactic acid into sugar (transformation of fatigue products).
3. The oxidizing of lactic acid into carbon dioxide and water (destruction of fatigue products).

THE USE OF NITROUS OXIDE ANALGESIA IN OBSTETRICS, WITH DESCRIPTION OF A SIMPLE APPARATUS.

In the *New York Medical Journal* of June 30, 1917, CHERRY points out that in the administration of an anesthetic during labor there are certain facts that should be ascertained before the general adoption of it. It is necessary to know what effect the prolonged use of the gas has on the mother and fetus. As to the mother, we should be sure that there is no interference with uterine contractions causing prolonged labor; that the blood-pressure is not increased materially; that there will be no secondary relaxation of the uterus tending to postpartum hemorrhage; and that there will be no toxic effect upon the kidneys and liver. In relation to the fetus, we should know that the fetal heart during the administration is not affected, and that no degree of asphyxia is present at birth. It is furthermore necessary to ascertain whether a sufficient amount of analgesia is obtained to warrant the expenditure of time necessary in giving the anesthetic.

At the Harlem Hospital in the Obstetrical Service of Dr. G. L. Brodhead, nitrous oxide has been administered to eighty-four patients during labor, and upon these careful examinations made. Nitrous oxide alone has been used in these cases without oxygen. The apparatus has been a simple one consisting of a nasal inhaler to which is attached a rubber tubing ending in a small rubber breathing bag. From this bag a tubing is joined to the reducing valve.

This valve is controlled by an adjustable screw attached to a wheel. This valve is set in by a clamp to the gas tank opening, and the flow of gas to the inhaler is entirely controlled by this after the tank valve is widely opened. This valve is similar in character to a needle valve on a carbureter, allowing for a maximum or minimum amount of gas being used.

The method of administration has been to adjust the inhaler over the patient's nose and to keep it there by an elastic head strap, the patient being in bed or on the delivery table. When the patient begins to complain of labor pains the administration of the gas is begun. The time of commencing the administration is usually toward the end of the first stage, when dilatation of the cervix is about three to four fingers. The gas is then given at the beginning of each contraction in sufficient quantities to ease the pain, and at its subsidence is discontinued. The patient is instructed to tell the obstetrician when the pains are beginning, and before the painful contractions have got well under way the gas has been administered in sufficient quantities, so that the full force and painful effect of the contraction has been diminished. This is repeated as often as pains occur. The amount of gas necessary to give complete or partial analgesia varies with different patients. Some neurotic and temperamental women require a great deal more than others of the phlegmatic type. This, naturally, has to be left to the judgment of the anesthetist.

As the second stage progresses and the presenting part advances on the perineum and appears at the vulva outlet, the nitrous oxide is discontinued and chloroform administered by the nurse, and the obstetrician prepares himself for the delivery of the child, which is then brought into the world under chloroform administered to the obstetrical degree. The object in changing to chloroform for the short time the head is passing over the perineum is to eliminate the necessity of employing a special anesthetist for administering the nitrous oxide gas. By this means the obstetrician him-

self can ease the pains of labor at the time when they are severe by the use of nitrous oxide, and later deliver the patient by changing the anesthetic to chloroform as in the usual case of labor. The expense of the administration is very slight in comparison to the amount of good accomplished. In an average case, in which nitrous oxide is started at the beginning of the second stage, one-half a tank is the amount used for the completion of labor. This, of course, varies with the individual's susceptibility to the analgesic effect, as was said before.

Of the eighty-four patients to whom gas was administered, thirty-eight were primiparæ and forty-six multiparæ. Forceps delivery occurred in four instances: three low and one medium forceps. In two cases in which pituitrin was used for inertia, four were multiparæ and two primiparæ, making six cases in all, or seven per cent. There were four breech deliveries, and one craniotomy in a contracted pelvis, with a dead fetus. The systolic blood-pressure was increased fifteen millimeters in one case, ten millimeters in two cases, and five millimeters in three cases. It was decreased twenty millimeters in one instance, and remained unchanged in seventy-seven cases. The fetal heart was unchanged in eighty-two cases, slowed ten beats in one case, and twenty beats in another. There was no maternal mortality. The fetal mortality was one, and autopsy on this baby showed a congenital atelectasis. The baby's mother had gas administered for five minutes.

There was one stillbirth; in this instance the fetal heart had not been heard throughout labor. In twenty-five cases there was complete analgesia, or 29.4 per cent. In fifty-eight cases there was moderate analgesia, or 69 per cent. In one case analgesia was absent, or 1.6 per cent. In this last instance the absence of analgesia can be accounted for by the fact that the patient was refractory and did not breathe properly. Amnesia was complete in five cases, moderate in three cases, and absent in seventy-six.

The length of time of the administration of the gas varied from five minutes to four

hours and twenty-five minutes. Asphyxia of the child occurred in three cases, each one of which had the umbilical cord around the neck one to three times. All three infants were revived. Cyanosis of the child occurred in two cases. In the other eighty-two cases there was no cyanosis. Cyanosis of the mother occurred moderately at the beginning of the gas administration in one case, and cleared up as labor advanced. One patient continued to have considerable cyanosis throughout. In the other eighty-two cases there was no cyanosis. The second stage in thirty-two primiparæ averaged one hour and fifty-five minutes. The second stage of thirty-one multiparæ recorded averaged one hour and twenty-two minutes. There were no postpartum hemorrhages, resulting from secondary relaxation of the uterus. No uteri were packed. Ergot was given, however, as a prophylactic after the completion of the second stage in every case.

From the above series of cases recorded and analyzed it can be deduced that with nitrous oxide administered alone during labor no ill effects upon mother and fetus were noted; that the resort to forceps or pituitrin was not more necessary than in the average cases of labor; that there was no tendency to postpartum hemorrhage; that the prolonged administration did not cause damage to the kidney or liver as far as could be observed clinically. These results have also been noted by others. Various observations made upon the effects of nitrous oxide on the individual organs lead one to conclude that it is the ideal anesthetic to use in obstetrics. A greater degree of analgesia can be obtained without complete narcosis; no kidney or liver changes have been noted following the administration over prolonged periods, because the elimination of nitrous oxide is entirely through the lungs; nitrous oxide remains in the tissues a very short period following its administration, which was shown by Kemp, who observed that 20 per cent of nitrous oxide found in the blood after administration was reduced in two minutes' time to 6.09 per cent. The apparatus described above is of

such compact and small size that it can readily be carried in the obstetrical bag. The gas tank with suitable covering and handle can easily be transported to each case of labor by the physician, or can be sent previously to the patient's house before labor begins.

In conclusion it may be said that the administration by the method described can be carried out satisfactorily by every physician practicing obstetrics at a minimum expense, and with the satisfaction of relieving the majority of patients of about 90 per cent of the severe pains of labor with no deleterious effect upon either mother or child.

FOCAL INFECTIONS.

Writing on this topic in the *Southern Practitioner* for July, 1917, BRYAN states that the best he can say under the head of treatment is to make careful examination, both subjective and objective examination, then remove any foci that can be removed.

Cholecystitis, which is always associated with cholelithiasis, is a focus that produces systemic diseases, and especially does it show its effects on the myocardium. After removal of stones, or maybe removal of the entire gall-bladder, the myocardial change is noted to improve, provided it has not undergone destructive changes.

In his cases complaining of stomach trouble the majority of the causes are outside the stomach. Cabot in his *Differential Diagnosis*, analyzing fifteen thousand cases of stomach trouble, showed that over twelve thousand were due to troubles outside the stomach. Among these cases cholecystitis and appendicitis are the most prominent of the intra-abdominal troubles.

Neglected gonorrheal foci in posterior urethra, prostate, and seminal vesicles may and often do cause systemic or arthritic diseases.

It is not an easy matter to find all the foci that are contributory to the causes, but we must not stop because we find the patient has simply hypertrophied tonsils but must search the entire body. Bryan remembers seeing a young man who had nephritis, and

in search for foci the tonsils were found enlarged and removed, which did not cause any exacerbation of his nephritic symptoms, nor did he seem to improve. His teeth were x-rayed and several foci were found. After extraction of the teeth he had several chills with high fever and general reaction. There were marked disturbances in urinary findings, but as his gums healed he improved rapidly. When one operates on the focus that is responsible for the systemic disturbance, then there seems to be more reaction than by operating on an innocent or unsuspected focus.

It is a warning worth while to say that in cases in which we have multiple foci, as are often found around the teeth, too much manipulation or operation should not be done at one sitting, because we stir up infection and make many abrasions which act as portals of entrance for an overdose of the toxins and bacteria. This is especially true in the cardiorenal cases which have a myocardium which is already overtaxed and weakened from a degenerated process. This is capable of causing an exacerbation of an old nephritis, which often leads to uremia and death. Before operating on the cardiorenal case it is wise to know as near as possible the condition of his blood-pressure, measuring as near as possible the condition of the myocardium; make functional tests by use of phenolsulphone-phthalein of the capacity of the kidney. By taking these precautions we may know better how to attack the foci of infection. In cases with a blood-pressure that the systolic readings vary at different beats of the heart and there is a frequent extra-systole with phthalein permeation test showing twenty or thirty, we should be slow to interfere with foci. Furthermore, there is danger of getting a general septicemia. To illustrate, Bryan saw a young man three years ago who had his tonsils removed because they were hypertrophied and he had some slight arthritic pains occasionally. Just a few days after his tonsils were removed he was seized with acute polyarthritis that involved practically all joints, and he was confined to his bed about six weeks.

BACTERIAL INFECTIONS OF THE URINARY TRACT FROM THE STAND-POINT OF VACCINE THERAPY.

BASU in the *Calcutta Medical Journal* for May, 1916, states that the value of treatment of urinary infections with vaccines may be summarized as follows:

1. Vaccines are of use in acute and sub-acute infections of the urinary tract.
2. As the flora causing the infection is very varied, an autogenous vaccine should be used whenever possible. [In infections with coliform bacilli an agglutination test should be carried out with the patient's serum against the bacillus isolated; if positive, the chances of success with vaccines are greater.]
3. Vaccines are not of much use in chronic afebrile cases of pyuria; they may alleviate the symptoms, but do not effect a cure.
4. Bacteriuric cases are not much benefited with vaccine treatment, but considering the fact that a few cases have been influenced, the treatment is worth trying in "carriers."
5. Vaccine treatment should always be carried out in connection with general treatment, rest, dieting, urinary antiseptics, etc. The treatment should not be carried to extremes.

THE MEDICINAL USE OF GLYCERIN.

The *Lancet* of June 9, 1917, states that in England there is now no glycerin being allotted for medicinal purposes, and pharmacists who have exhausted their supply can only obtain more by borrowing from those who have some left. As was noted four months ago, the Ministry of Munitions considered that the stocks then in the hands of pharmacists should be sufficient to meet the legitimate demands of prescribers. An analysis of prescriptions undertaken by the *Chemist and Druggist* thirty years ago showed that glycerin came out ninth on the list of favorite drugs, and its use both in mixtures and as a toilet preparation has probably much increased since then. But neither as a solvent, a demulcent, or a flav-

oring agent is glycerin at all indispensable, and medical men would do well to assist the pharmacists in restricting its use to the few remaining purposes—perhaps in the case of calf lymph or in organo-therapeutic extracts—in which hardship would result from its withdrawal. It should hardly be necessary to point out that to prescribe glycerin freely in a lotion might place the conscientious pharmacist in a difficult position. He is prohibited by law from supplying it direct to one customer for toilet purposes, and it would be invidious for him to supply it to another customer for the same purpose on a medical man's orders.

OIL OF CHENOPODIUM AND CHLOROFORM AS ANTHELMINTICS.

HALL and FOSTER in the *Journal of the American Medical Association* of June 30, 1917, state that their experimental findings indicate that oil of chenopodium should be accompanied by large doses of castor oil, and that when so given it is an uncommonly effective and quite safe anthelmintic for use against ascarids. Chloroform in castor oil, in therapeutic doses, is the most effective anthelmintic they have found for use against hookworms, and they consider it as safe as thymol or any other effective drug for use against hookworm disease.

THE TREATMENT OF NEURITIS, WITH SPECIAL REFERENCE TO SCIATICA.

The *Lancet* of June 16, 1917, contains an article by SAINSBURY in which he well says that at all times sciatica is apt to be an obstinate affection, so much so that, as one authority has put it, its treatment, or rather its resistance to treatment, has come to be regarded almost as an *opprobrium medicinæ*. It is for this reason that he is anxious to draw attention to Dr. Wingfield's treatment, which in its simplicity of procedure leaves nothing to be desired, and in its effectiveness has been so encouraging thus far that it is to be hoped others will be induced to give it a trial and thus test its

efficiency. An additional reason for giving prominence to the method at the present moment will be found in the considerable prevalence of neuralgias and myalgias among the British invalided soldiers.

The treatment consists in the direct application of the strong hydrochloric acid of the B. P.—in common parlance, fuming hydrochloric acid—to the skin, along the line of the inflamed and painful nerve. The acid in question contains 31.79 per cent of gaseous hydrochloric acid and has a specific gravity of 1.160; in the British text-books it is written down as an *escharotic*. That this acid should be capable of safe application to the bare skin will probably come as a great surprise to a good many who, like the writer, had been accustomed to treat it with great respect as a corrosive acid. The *modus operandi* is first to mark out the line of the nerve pain and tenderness as it happens to present itself in the individual. Sir William Gowers describes the areas of pain in sciatica as "usually most intense in certain spots—(1) above the hip-joint, near the posterior iliac spine; (2) at the sciatic notch; (3) about the middle of the thigh; (4) behind the knee; (5) below the head of the fibula; (6) behind the external malleolus; (7) on the back of the foot." These areas are to be selected when present. In general the practice of the writer has been to carry a broad line of application, some $1\frac{1}{2}$ inches across, straight down the back of the thigh from the gluteal fold to the popliteal space; another application of like breadth for about three inches behind the head of the fibula along the oblique course of the external popliteal nerve at this spot; lastly, for some 5 or 6 inches behind the external malleolus directly downward; and below the malleolus obliquely on to the dorsum of the foot. The extent of the tenderness will guide more or less as to the extent of the application. A wad of cotton-wool, firmly compressed into a knob of the size of the knuckle of the middle finger, is used to suck up the acid, of which about half a drachm to a drachm will be required. The charged wad, grasped by the finger and thumb (previously vaselined), is then car-

ried gently along the line of application above described. The degree of firmness may be increased subsequently if necessary, and the part may be painted two or three times at one sitting if the skin bears the acid well; the first application should be light and single in order to gauge the sensitiveness of the part, and if the integument happens to be thin and delicate it should receive correspondingly light treatment; Dr. Wingfield prefers to apply the acid with a camel's-hair brush. A considerable smarting is sometimes complained of; in other cases little more than a tingling or sense of mild heat is felt. After the application a light covering may be thrown over the part till the skin is dry. The smarting soon passes off and the slight redness induced disappears also; no dressing is required. Rarely, in delicate skins, is a papular rash excited; it should be allowed to subside before reapplication of the acid. Blistering has not been observed either by Dr. Wingfield or the writer. The treatment may be repeated twice a week if need be, perhaps oftener; it should be continued so long as the pain and tenderness continue. Massage may with advantage supplement the treatment, and particularly if there has been obvious wasting.

In three cases of sciatica recently admitted into the Bermondsey Military Hospital, Ladywell, the results have been striking and greatly appreciated by the patients themselves. Two of these were bad cases of long duration, and in one there was marked wasting of the muscles of the leg and thigh. Dr. Wingfield has had equally good results in sciatica and in the neuritis of other nerves also, and only once, in a case of neuritis of the upper arm, does he recall the occurrence of troublesome rash, lasting about fourteen days; this he attributed to a too free use of the acid. Amongst his cases he records a case of a neuritis of the arm accompanied by an acute eczema which prohibited the use of the acid; in this case he got rid of the eczema by the application of oleum Deelinæ, and having done this was able to apply the acid and cure the neuritis. These cases occurred

for the most part in his practice when physician at Winchester.

How does the acid act? It cannot be by virtue of its acidity—*i.e.*, its power to neutralize alkalinity—for there is no alkali to neutralize on the surface of the skin, and the power of penetration of the integuments by this highly volatile acid, free to evaporate without let or hindrance, must be minimal indeed. Neither can it be due to its power to act as a counter-irritant, thereby driving blood to the surface (*ubi stimulus ibi affluxus*), and at the same time sending centripetally, for all they are worth, its sensory stimuli, the objections being that the afflux of blood observed is very slight and very transient (the development of a persistent congestion or mild inflammatory state is quite exceptional), and that the actual nerve irritation produced is far below that which iodine and other established counter-irritants set up, with such disappointing results in respect of the cure of neuritis.

The explanation we must leave for the present, the point to arrive at now being the establishment, on a large experience, of the clinical value of the acid in the treatment of sciatica in particular and of neuritis in general, and, perhaps, of that nondescript class of complaint, now so prevalent and so troublesome, labeled "myalgia." Some cases of the last-named class—*e.g.*, lumbago and allied painful conditions—have responded encouragingly; but at this stage it would be unwise to make too wide the terms of reference of this remedy; let the *fiat experimentum*, therefore, limit itself to sciatica and other forms of well-defined neuritis. The value of hydrochloric acid in these affections being confirmed, the investigation of the relative value of other members of the group of acids should follow naturally. The group is a large one, so large that perhaps it would be best to proceed next to the congeners of hydrochloric acid—*viz.*, the other halogen compounds, hydrobromic and hydriodic acids. Though, according to the opinion of some, pharmacology be but an alluring madness, let there be "method in't."

SOME PRACTICAL CONSIDERATIONS IN CHRONIC HEART DISEASE.

PATEK in the *Wisconsin Medical Journal* for June, 1917, states that his views may be briefly summarized as to the measures of relief in broken compensation as follows:

1. *Rest*—absolute and prolonged—the first essential in every form of decompensation. Later, the heart's response to exercise, and the presence or absence of dyspnea, are good indicators of its improved function.

2. *Digitalis*, when given in the usual therapeutic dose, does not increase blood-pressure, and may be safely given in all cardiac breakdowns. It will often be found useful in small tonic doses, even when systolic tension is high.

3. *Opium* is of inestimable value, and is indispensable in most cases of broken compensation. When combined with digitalis, the latter often has an effect which it cannot produce acting alone.

4. *Diet* may reduce high pressure and relieve symptoms due to hypertension. In cases of decompensation with dropsy, with a pulse of fair volume, the Karrel-Kur (1 quart of milk daily in divided doses, without the addition of other food or drink) is frequently followed by startlingly quick cardiac response, and an early subsidence of the dropsy.

5. *Depletion* by calomel, blue mass, or other cathartics is often called for, before digitalis can make an impression upon the disabled heart, because the mass movement of blood gives rise to splanchnic engorgement, thus creating an impediment to the circulation.

6. *Venesection* in high tension with symptoms is a remedy of no mean value. An acutely oncoming epistaxis has probably often prevented a cerebral accident; we can do likewise with our lancet, and should resort to it more frequently than is our custom.

7. *Vasodilators* Patek places on the lowest rung of this therapeutic ladder, because—while in very common use—their reputation for service has exceeded their efficiency. They are not heart tonics, and are only

given where high pressure head symptoms are present, or anginoid attacks exist or threaten; here the vasodilators are indispensable and will often act promptly and excellently, but their action does not extend beyond symptomatic relief, and is very evanescent. When nitroglycerin fails, it may be because too small a dose is given. Several doses, repeated at very brief intervals, may give speedy relief, where the usual small dose fails. Thyroid extract, while frequently not reducing the tension, will give marked symptomatic relief. Patek has found it particularly useful in allaying distressing tinnitus and dizziness.

8. Other measures—stimulants, sedatives, and diuretics—are useful also, but those mentioned Patek considers of prime importance, indispensable in acute cardiac breakdowns, particularly of the cardiorenal type.

RECENT RADIUM THERAPY.

The *Prescriber* for June, 1917, points out that the periodical reports of the London Radium Institute may be regarded as a record of the progress of radium therapy in England. The Institute, while it is not the only one of its kind in Britain, has exceptional facilities and opportunities for testing the value of radium as a therapeutic agent, and its reports invariably show a moderation in tone that might well be copied elsewhere. The report most recently published covers the work done from January, 1915, to December, 1916. In all 1400 cases were dealt with during the two years, but the results of treatment are noted in 1157 only. Of these 52 were cured, 172 apparently cured, 498 improved, and 251 not improved; treatment was abandoned in 144 cases, and 76 died.

The detailed report shows that in small epitheliomata affecting glabrous surfaces the results are encouraging, but in epitheliomata of the buccal, laryngeal, and pharyngeal membranes, while temporary improvement frequently follows, the final result is usually disappointing. In uterine carcinoma the symptomatic improvement is most striking, and in some instances cases previously

declared to be inoperable become operable. The results in carcinoma of the rectum are by no means constant or uniform; generally those cases do best which occur in patients over fifty, and in which the growth is annular, vascular, and situated in the upper half of the rectum. As regards mammary cancer, the report says that radium should never be used as a substitute for operative interference in early cases. In slow-growing cases of the atropine type it is often useful in checking the progress of the disease.

Of all forms of malignant disease, rodent ulcer is the one which is most amenable to the action of radium. Lesions not previously subjected to other treatment, which do not affect mucous membrane, bone, or cartilage, and are small in size, can usually be cured by one treatment. Sarcomata usually do well, under vigorous treatment, if dealt with before dissemination into any of the internal viscera has taken place. Certain forms of lymphadenoma generally derive benefit, and mediastinal tumors are particularly susceptible to the action of radium. In fibroid disease of the uterus satisfactory results are often observed, and the same may be said of papilloma of the bladder, though few cases of this last have come under notice. Lupus vulgaris usually responds better to Finsen light, but when this fails to effect a cure radium may be used with fair prospects of success. Nevi, warts, and papillomata generally do well under radium, and the treatment of keloid is most successful. Other skin diseases amenable to radium treatment are pruritus, chronic eczema, psoriasis, and *x*-ray dermatitis. Radium is sometimes of great value in exophthalmic goitre, while the daily administration of radium emanation solution often produces remarkable improvement in arthritis deformans.

The use of radium at the Edinburgh Royal Infirmary during 1916 has recently been reported on by Dr. Dawson Turner (*Lancet*, 1917, i, 546, April 7). The sixty-six cases treated included rodent ulcer, inoperable malignant disease, exophthalmic goitre, and nevi. Among other points it is

stated that sarcomata are more amenable to radium treatment than carcinomata; rapidity of growth is no bar to its employment, the cells of such growth being more vulnerable than those nearer the normal; and it is found that round-celled sarcoma reacts more favorably than the spindle-celled or the polymorphous-celled variety.

These reports go to show that while radium is a valuable therapeutic agent, it has its limitations as well as its advantages. The reports also confirm previous findings in this respect, and show definitely in what direction we may look for best results. The technique is as important in radium treatment as in any branch of surgery, and it is essential that the element be used only by those thoroughly skilled in its employment. It is now generally recognized that too large a dose is worse than no dose at all—the exact therapeutic dose has to be carefully ascertained before treatment can be carried out successfully. The great cost of radium is a bar to its indiscriminate use, and the establishment of Radium Institutes is the only way to insure that the greatest amount of good may be obtained from its employment. Radium substitutes as a rule do not give the same results, and it is only in the study of radium itself that we can hope for progress.

SOME ASPECTS OF MALARIA IN CHILDREN.

In the *Interstate Medical Journal* for June, 1917, DEADERICK states that in the treatment of malaria in children the best practice is to administer the quinine at short intervals, say every two or three hours. While children bear quinine in relatively large doses better than adults, the size of the dose should be regulated by the severity of the attack and the age of the patient. In average cases, children from six months to two years of age may be given from $\frac{1}{2}$ to 1 grain of quinine every three hours; from three to five years, 1 to 2 grains; from six to ten years, from 2 to $2\frac{1}{2}$ grains. These quantities may be increased in severe attacks. The drug is ordinarily given by mouth. Where cap-

sules cannot be used, recourse must be had to a tasteless preparation or to a disguising vehicle. Euquinine and tannate of quinine are the best of the tasteless preparations. The former must be given in slightly larger doses, the latter up to double the dose indicated above.

The most efficient liquid for disguising the taste of sulphate of quinine is the syrup of yerba santa, at least one drachm of which should be given for each two grains of the quinine. In cases with pernicious symptoms the drug must usually be injected intramuscularly in dilute solution. The best salt for this purpose is the dihydrochloride. Intravenous administration is preferable, but the veins of young children are sometimes very difficult to penetrate. Rectal administration of the solution or suppository may be employed to supplement the other methods. The buttocks should be pressed together for one-half hour after insertion to aid retention.

Inunction of quinine and lard is a common practice in the South. It should not be depended upon as the sole method, but may be employed as an adjunct. Deaderick has had no experience with inunctions of quinine and glycerin, which are said to be very effective. Calomel, mercury and chalk, and castor oil are the most efficient purgatives in the treatment of malaria in children.

EFFECT OF INGESTION OF COFFEE, TEA, AND CAFFEINE ON THE EXCRETION OF URIC ACID IN MAN.

In the *Journal of the American Medical Association* of June 16, 1917, MENDEL and WARDELL state that the addition of strong coffee infusion to a purin-free diet causes a marked increase in the excretion of uric acid.

The addition of Kaffee Hag—a decaffeinated coffee product—to a purin-free diet does not cause any increase in the excretion of uric acid. If, however, caffeine is added to the Kaffee Hag the excretion of uric acid is decidedly increased, as in the case of coffee.

The effect of adding tea to a purin-free

diet is similar to that obtained by adding coffee to the same diet.

The increase in excretion of uric acid after adding coffee, tea, or caffeine to a purin-free diet seems to be proportional to the quantity of caffeine ingested.

The increase in the amount of uric acid excreted under these conditions is equal to the quantity of uric acid which would be obtained by the demethylation and subsequent oxidation of from 10 to 15 per cent of the ingested caffeine.

ABSCESS OF THE LIVER.

The *China Medical Journal* for May, 1917, contains an article by LUDLOW in which he discusses this subject in amebic infection. He says that among the operative procedures advocated are the following:

Aspiration Method: This may be done by means of a trocar and cannula with rubber tube for drainage. This method was used with success by Manson. Others have simply aspirated one or more times. Of late some have aspirated and at the same time have given the emetine treatment. Some of the disadvantages of this method are: (1) repeated aspirations are often necessary, and in certain cases open operation must be resorted to after aspiration has failed; (2) difficulty of retention of tight-fitting cannulas or stiff rubber tubes, on account of the constant movement of liver; (3) the pus sometimes is not discovered by aspiration, or it may be too thick to flow through the cannula.

Method of Approach through Abdominal Incision: In this operation, as usually performed, incision is made in the epigastric region, the liver is fixed to the abdominal wall by rows of stitches through its capsule and the peritoneal covering to the edges of the abdominal incision. The opening is maintained by packing, and the opening of the abscess delayed twenty-four to forty-eight hours.

The disadvantages of this method are: (1) two operations are necessary; (2) drainage is not good; (3) infection of the abdomen may occur.

Transthoracic Method: In his book on "Tropical Medicine," Jackson writes: "If there is bulging between the ribs we may expect the abscess to have for its covering the diaphragm and the pleural layers. These will require stitching together in order to prevent the escape of pus into the pleural cavity. A resection of one or two ribs must precede this stitching. This done the abscess may be opened by an incision through pleura and diaphragm. Deep-seated abscesses should rarely be approached in this way as the steps of rib resection, uniting the diaphragmatic and the parietal pleural layers, anchoring of the liver to the wound, and incision of the hepatic peritoneum, are all preliminary to the search for pus within the liver substance. The situation of the liver at the bottom of a deep recess, its movements to and fro with respiration, hemorrhage, and the technical operative difficulties unite to make this a deservedly unpopular operation."

While this may be true in an approach to the liver as indicated, yet if a portion of the ninth rib near its costal end is removed the above difficulties are largely obviated.

In most of the cases of Ludlow's series the following method has been used: A preliminary dose of morphine (grain $\frac{1}{4}$) or H. M. C. tablet No. 1 is given. The aspirator is employed for diagnosis only when the patient is brought to the operating-room and all is in readiness to proceed with the operation.

The aspirator is usually inserted with local anesthesia. In certain cases in which existence of an abscess was strongly suspected, Ludlow has operated even after failure to obtain pus by aspiration, and has each time been rewarded by evacuating a large abscess filled with a very thick pus. Lately, when the diagnosis has seemed very certain, he has operated without using the aspirator. Ether or chloroform is administered, but the anesthetic must be used with great care and as little as possible given. Incision is made parallel to the ninth rib, beginning about two inches from the costal margin. A portion of the rib two inches in length is resected, the dia-

phragm incised, and the liver exposed. A small incision is made in its capsule, blunt scissors inserted into the abscess cavity, and the wound enlarged by opening the scissors and drawing them out. As soon as the cavity is opened the finger of the operator is inserted and the liver held close to the wall while the pus is allowed to escape. After most of the pus has been evacuated search is made for any other compartments of pus. The cavity is packed with gauze, which is left undisturbed for thirty-six to forty-eight hours.

After this the abscess is treated by drainage with rubber tube and gauze. Counter-drainage has been made in some cases. In large abscesses, after the pus has been evacuated, the drainage has sometimes been interfered with by the changed position of the liver. In the first few operations an attempt was made to sew the liver capsule to the parietal peritoneum, but in the last twenty cases this was not done. Ludlow tries to keep the patients on the right side after operation.

Treatment by Emetine: During the year 1912 no emetine was used. The patients operated on during that year all made good recoveries.

In 1913 emetine was used in three out of four cases. It was given twice a day ($\frac{1}{4}$ grain) for a week following operation. Except in one case in which amebæ were found in the feces it seemed to be of no special importance in hastening the recovery.

In 1914 emetine was used in four out of six patients. This time it was given in $\frac{1}{2}$ -grain doses twice a day for six days. During this year there was no marked improvement which could be attributed to emetine, but Ludlow continued its use because others had reported such good results.

In 1915 it was given in 1-grain doses once a day for a week. During Ludlow's furlough in this year Dr. Oh operated on six cases of liver abscess, following the method of operation as described above. All the patients made a good recovery. He reports that he used emetine over longer periods than one week, but could see no

rapid progress after its use. Since Ludlow's return to Korea he has omitted the use of emetine, except in the last case, and it was given then because of bowel disturbance which simulated dysentery, though the amebæ were not found. It is not his desire in any way to discourage the use of emetine in these cases, though his judgment is that the matter of securing and maintaining good drainage is much more important.

In conclusion Ludlow makes the following suggestions:

1. Keep a mental attitude of suspicion as to the possibilities of liver abscess in localities where dysentery is prevalent, and do not exclude liver abscess because of normal pulse, temperature, respirations, or blood count.

2. Use the aspirator only when all preparations are made for further operation. Only positive findings are of value.

3. While it may be necessary to vary the operation according to the conditions found, yet in most cases the operation described above should prove satisfactory even in those cases in which no adhesions are present.

4. Emphasis should be placed on the necessity of keeping a good opening for drainage. If this is left to an assistant, unless he is well instructed, he is very apt to let the external opening close too quickly.

THYMOL TREATMENT OF TRICHINOSIS.

In the *New York Medical Journal* of June 16, 1917, KAHN points out that the second stage of trichinosis infection is difficult of treatment because the parasite has left the intestinal canal and has lodged itself in the muscles and other tissues of the body where it is difficult to reach by means of remedies administered by mouth. It is futile to give thymol by mouth after the parasite has wandered out of the alimentary canal. The thymol does not circulate in the blood as such after its absorption from the alimentary mucous membrane. Its antiparasitic properties are neutralized in the liver in the following

manner: Thymol is metaisopropylcresol. From the intestine it is absorbed into the portal circulation, and there conjugated with sulphuric and glycuronic acids and excreted in the ester form in the urine. This process of conjugation is the means used by the body to detoxicate the aryl compound. It is obvious then in order to attack the trichinæ in the muscle and tissues, a method of administration of thymol other than administration per os must be resorted to. Parenteral injections of thymol would exclude the conjugating influence of the liver. The thymol would be absorbed in the blood and would circulate as such, and thus be able to attack the parasite *in situ*. From the success that Kahn has obtained in the treatment of trichinosis in the Western Pennsylvania Hospital, Pittsburg, he would suggest the following method of procedure:

Fifty grains of thymol are dissolved in 50 Cc. of sterile olive oil, which has been autoclaved for several minutes. The solution is then resterilized and used. The patient is given from 2 to 3 Cc. of this solution subcutaneously or intramuscularly daily for seven days. The urine is examined daily for evidence of any kidney irritation, in which case the administration of thymol should be stopped or the dose reduced for a few days. After a week's treatment the administration should be discontinued for about a week or ten days, and then a week's treatment should be again instituted.

In Kahn's experience, such a course of treatment does not induce any toxic effects due to the thymol. In cases in which a septic temperature occurs temperature becomes normal after four or five doses. The pain in the muscles, the edema of the eyelids and face, the dull mentality of the patient, all due to the parasitic influence, become very quickly relieved. With the destruction of the parasite in the tissues it will be observed that the eosinophiles in the blood become very much increased, and the sections of the muscles will show destructive processes around and in the

parasite. Kahn has observed that after thymol administration showers of leucocytes appear in the urine, which upon staining were proved to be mostly eosinophiles. Before the thymol treatment this was not observed in the same cases. In normal individuals the administration of thymol does not induce an eosinophilia, nor are there present in these normal individuals any eosinophiles in the urine after thymol injections.

It may be advisable to try this method of treatment in cases of cysticercus, filaria, and echinococcus invasions of the tissues.

THE TECHNIQUE OF LUMBAR PUNCTURE.

FOSTER in the *Lancet* of June 2, 1917, writes on this topic and points out that in the first place a restricted flow may occur drop by drop, simulating the normal rate, or, on the other hand, five or six drops may run in rapid succession, followed by a pause. This latter phenomenon would at once suggest that the mouth of the cannula was not lying free in the arachnoid space. Another point is that when such a restricted flow occurs the respiratory movements are not imparted to the column of fluid. The explanation of this occurrence must of necessity be largely a matter of conjecture. A possible explanation is furnished by the surmise that the dura mater is pushed in front of the needle and then pierced, the mouth of the cannula thus lying in a narrow chink between the approximated dorsal and ventral dura mater. The dura mater is bound to the bony canal by loose areolar tissue which could be easily separated by a comparatively blunt needle. In this regard Foster might remark that this contretemps occurs most frequently when the needle fails to reach the theca at the first plunge and has already struck bone. Further, he had more often met with this difficulty at the end of a series of eight or ten operations on different patients when the same needles had to be reboiled and used a second time. The simple maneuver of gently

withdrawing the needle will frequently establish a good flow, possibly by widening the interval between the surfaces of the dura mater. Rotation of the needle will in some instances establish a full flow, particularly if the needle has been introduced in such a way that the mouth of the cannula does not look directly toward the cephalic aspect of the arachnoid space. If these maneuvers fail a full flow will always be obtained by taking a sharp needle and selecting another space.

A "dry puncture," except in cases of hydrocephalus, Foster takes to be proof positive that the needle has not entered the theca. Where the fluid is thick and purulent and a good flow cannot be obtained even with the assiduous use of the stylet it seems probable that, as Dr. Horder suggests, the needle may have entered a locus. A fresh puncture at another level will often secure a more abundant flow. When the fluid is blood-tinged and not obviously purulent it is better to perform a fresh puncture in order to obtain fluid free from blood for cytological examination. Foster has rarely found fluid blood-stained on a second puncture at another level.

THE FOOD VALUE OF MEAT PREPARATIONS AND MEAT EXTRACTS.

The *Boston Medical and Surgical Journal* of June 14, 1917, expresses the belief that a great deal of misapprehension still exists as to the food and medicinal values of soups, broths, and the various meat preparations and meat extracts. The laity have a great deal of faith in them, and the profession is not clear enough on the subject to take a positive stand relative to them. While they do no direct harm, they are of harm indirectly because they are relied upon to give a nourishment which it is not in their nature to give, and which might be given except for their use as a food. A review of most of the more recent investigations brings out the fact that practically none of these products has any real food value.

Soups and broths are, of course, widely used as articles of diet. Their main virtue lies not in their food content, but in their flavor. They are condiments rather than foods. One pound of beef cut up and boiled with one-third of a pound of veal bones, and the whole boiled down to one pint of strong soup, yields only about 5 per cent of solid matter, consisting of about equal parts of gelatin, fat, and extractives, with a little mineral matter. Most clear soups contain not more than two and a half per cent solid matter—at best a negligible amount of solid matter, even if that amount were real food. They have a culinary value as vehicles for starchy or nitrogenous matter—that is, for making thick soups. Moreover, clear soups do act as appetizers, and as such stimulate the gastric juices. In most cases this is not desired. In acute febrile conditions the nature of the diet permitted finds no use for an increase in the amount of the digestive juices.

Of the various beef preparations, beef extracts are best known and most widely used. They are urged upon the public in the guise of highly concentrated foods. About 34 pounds of beef are usually reduced to make one pound of beef extract, and this, in turn, is recommended for the making of about 70 pints of beef tea. Analyses of such preparations show that the total protein content ranges between 14 and 19 per cent. Not more than 7 per cent is albumose. The total nitrogen content is not above 9 per cent (*Lancet*, 1908, ii, 1222). Extractives of the xanthin type form the largest proportion of these preparations—even up to 60 per cent. In these proportions beef extracts are far from concentrated foods. Indeed, they cannot conscientiously be recommended as foods. Beef extracts have neither stimulating effect upon the heart nor upon the nervous system, nor do they have any effect to reduce the time for recovery from fatigue. They, too, like soups and broths, stimulate the gastric juices. Their proper place is in the kitchen rather than at the bedside. In the metabolic diathesis, where there is

already an overproduction or retention of these meat extractives, the ingestion of extractives in the large quantities contained in these meat preparations can do much harm. It is possible, however, that any benefit derived from the use of these preparations may arise from the presence of vitamine, in which beef is so rich. Even this is but a probability, for it is not unlikely that the vitamine may be rendered inert during the reducing process in the preparation of these extracts.

In regard to the beef juices, when prepared by the warm process, even the small amount of soluble protein becomes coagulated. The cold process at least obviates this difficulty, but there is, on the other hand, the tendency to putrefaction. With neither process, however, is there at best more than 9.5 per cent of protein. The usual range is from .3 to 17 per cent. Some of the poorer qualities of beef juices are nothing more than beef blood. Beef juices containing even 5 per cent of protein would require three pints daily to feed an invalid. In circulatory, nephritic, or like conditions, this added introduction of fluids into the circulation increases the blood-pressure or puts an added tax upon the glomerular epithelium, which might be highly undesirable.

Beef tea can be entirely dismissed as a food or as anything else of value, for it rarely contains more than one and a half per cent of protein. Beef powders, on the other hand, are not really beef preparations in the sense that meats are rendered in their preparation. The whole beef is merely dried and then powdered. The meat protein is present undiminished, but the bulk is reduced. The meat powders are useful in some cases of forced feeding, for long marches and under like circumstances. Under present conditions of food stringency, the destruction of large quantities of food for their preparation is little short of criminal. The abolition of these foods from the dietary of the general public and from that of the invalid would be a step in the direction of rational food economy.

EPIDEMIC CEREBROSPINAL MENINGITIS.

In the *New York Medical Journal* of July 14, 1917, ROSENBERGER and BENTLEY report their study of 67 cases.

The treatment, as soon as a bacteriological diagnosis was made, consisted in the injection of antimeningococcus serum. In some cases 15 Cc. were given, but in most cases the initial dose was 20 to 30 Cc. After this dose, no matter how much fluid was withdrawn, 30 Cc. was the regular dose. In one case only 2.5 Cc. of fluid were obtained by puncture, yet 30 Cc. of serum were given. This amount of serum was given sometimes daily, sometimes in severe cases twice daily, and in others every second or third day according to the severity of the case. In some cases whose illness lasted over a week or ten days a total of 300 Cc. was given, and where these large amounts were injected, from 300 to 435 Cc. cerebrospinal fluid had been withdrawn. In some of the fatal cases the serum did not in any way alter the character of the fluid, the only marked point being a diminution of the number of or absence of microorganisms in the fluid. In one or two instances flushing the spinal canal with normal salt solution was tried, but with no good results. Following the administration of the serum, headaches were common, cramps in the legs were almost constantly noticed, but in only one case was syncope present, and this followed the too rapid introduction of the serum. In three cases urticaria developed after the third or fourth injection of serum. In one of these the wheals were of the giant type.

The summary of these cases is as follows: Number of adults, forty, of whom twenty-three were white and seventeen colored. In this group the mortality was approximately 55 per cent—fourteen white and eight colored. Eleven patients are now convalescent. Number of children from two months up to eleven years, twenty-seven, of whom fifteen were white and twelve colored. The mortality in these children was 40.7 per cent—seven white

and four colored. In one, an extremely mild case, recovery took place without any serum being given, and in another, recovery followed the injection of 15 Cc. Serum treatment should be instituted at once after a bacteriological diagnosis is made, and the longer the time which elapses before its administration the more unfavorable the prognosis. It is a well-known fact that the mortality has been reduced from 80 per cent to between 20 and 30 per cent in some epidemics. In this epidemic the mortality was exceptionally high, although the serum treatment was instituted as soon as the case was diagnosed, and some even before a diagnosis was confirmed bacteriologically.

It is the firm belief of the writers that if these cases had been diagnosed earlier, and the serum given immediately, the mortality rate would have been decidedly reduced. It is also possible that in this series of cases the meningococcus was of an extremely virulent type, as it was proved in animal inoculations. In view of the high mortality in this epidemic, and the possible high mortality of other epidemics, it does not seem unwise to recommend that a dose of antimeningococcus serum be given in suspicious cases of meningitis where cloudy cerebrospinal fluid is withdrawn upon puncture. It appears reasonable to insist upon lumbar puncture in all cases in which a suspicion of meningitis exists, as there were a number of instances in this group where no puncture was made and others where puncture was made a number of days after the case came under observation.

The disease is of such a nature that specific treatment to be of any value should include administration of serum at the earliest possible moment. The adult patients were kept in the medical wards most of the time and no new cases developed. The children were all segregated in the isolation buildings, and attended by nurses and helpers. No new cases developed in nurses or attendants. In two instances three cases developed in one family, but in no other instance were there multiple cases observed. In those who lingered a week or ten days

the number of sequelæ was extremely small; one patient became deaf and one was stricken with blindness in the left eye. In two cases an endocarditis developed after convalescence had been progressing for more than two weeks.

TREATMENT OF POLIOMYELITIS WITH IMMUNE SERUM.

Writing in the *New York State Journal of Medicine* for June, 1917, TAYLOR states that the preparation of the serum used in the cases he reports was briefly as follows: Collected aseptically, allowed to clot; serum separated, to which 0.2 per cent of trikresol was added and allowed to stand for twenty-four hours, filtered Berkefeld N, transferred to hermetically-sealed glass tubes and kept on ice.

Blood was collected from persons who had had the disease in the summers of 1914 and 1915, all of whom were otherwise healthy.

Serum was given intraspinally by gravity method, and subcutaneously and intravenously.

In all cases the clinical diagnosis was confirmed by microscopic and chemical examinations of the cerebrospinal fluid.

All of the cases were field cases. Most of them were in rural districts in widely separated parts of the State.

Of the nineteen cases treated, two died. One of these was practically *in extremis* at the time treatment was begun, 96 hours after onset of disease. Three were negative, the serum having been given 164, 192, and 288 hours after onset of the disease, at which time the temperature was normal and paralysis definite and marked. Serum was given to see if there would be any temperature reaction at that time. There was none.

In practically every case that received serum during acute febrile stage there was a definite temperature reaction within a few hours, namely, a rise in temperature, sometimes as much as three degrees. This was noted after first and second doses, even

after so small a dose as 10 Cc. subcutaneously.

In six cases there was no further progress of paralysis, with improvement more or less marked. The remaining eight cases recovered completely.

1. Serum taken from cases of three years' standing appears to influence the course of the disease.

2. Serum prepared as described can be administered intraspinally by gravity method, and intravenously without danger, if well-known rules of precaution are observed.

3. Serum should be administered both intraspinally and intravenously.

4. Early diagnosis, confirmed by microscopic and chemical examination of cerebrospinal fluid, followed by administration of 30 Cc. or more of serum gives best results.

5. The administration of serum after the acute febrile stage is over and definite paralysis has developed is useless.

SHOULD THE COLON BE SACRIFICED OR MAY IT BE REFORMED?

In the *Journal of the American Medical Association* of June 30, 1917, KELLOGG virtually protests against modern methods of attacking the colon. He says that in his experience nine out of ten, or even a larger proportion of patients suffering from severe stasis involving the large or small intestine, or both, may be made well and maintained in good health by the thoroughgoing and persevering application of measures of treatment which wholly exclude surgical procedures of any sort. This statement is based on the successful treatment of several thousand cases of chronic intestinal stasis which had stubbornly resisted all ordinary measures of treatment. A few weeks is usually sufficient to bring the patient to a state of improvement in which two or three natural evacuations occur daily, and to establish a regimen, by the following of which the patient may maintain his improvement indefinitely. This, of course,

must be accomplished without the use of laxative drugs and mainly by dietetic measures.

In a few cases in which stasis is due to pronounced mechanical obstruction, comparatively slight surgical procedures will accomplish all that is necessary to render the dietetic and other measures above referred to effective. In by far the majority of cases in which non-surgical measures fail, the seat of difficulty will be found to be a prolapsed and adherent or incarcerated pelvic colon. As pointed out by Case in numerous papers, adhesions may be readily shown when present by a Roentgen examination. The operative measure required is a simple one. It is only necessary to break up the adhesions by careful dissection and to prevent recurrence of the difficulty by attaching the pelvic colon to the omentum, which is in turn made fast to the abdominal wall at a point near the umbilicus. By this procedure the pelvic colon is suspended by a swinging attachment which does not interfere in the slightest degree with the movements of the intestine and does not give rise to the pain from which patients usually suffer when the intestine is attached directly to the abdominal wall.

Another operation which is occasionally but less frequently indicated is repair of the incompetent ileocecal valve. This condition, however, is practically always secondary, and is rarely found except when associated with a prolapsed and adherent or incarcerated colon or a spastic condition of the distal colon. The operation for repair of the ileocecal valve is a simple procedure and not accompanied by greater risk than the operation of appendectomy.

Within the last ten years Kellogg has performed the operation of colectomy in twenty cases.

The indications for the operation in the several cases were as follows:

In seven cases, cancer of the cecum or ascending colon with obstruction.

In one case, tuberculosis of the cecum and terminal ileum with obstruction.

In one case, gangrenous colitis of the entire colon.

In four cases, extreme colonic stasis, the result of short-circuiting operations previously done elsewhere.

In seven cases, intractable stasis due to so-called Jackson's membrane or adhesions.

These twenty cases have been selected from more than 40,000 cases which have been treated in the Battle Creek Sanitarium clinic during the last ten years, or less than one in 2000. Most of these patients have been found to be suffering from intestinal stasis, but they were relieved by non-surgical means, or by simple restorative surgical procedures.

The non-surgical means which Kellogg has employed most effectively in relieving stasis are the following:

1. A low protein, bulky diet consisting largely of fruits, fresh vegetables, and whole-grain preparations.

2. The free use of bran or agar-agar, or a combination of both, at every meal. From one-half to an ounce of cellulose daily seems to be necessary to stimulate the bowels to normal activity.

3. The use at every meal of half an ounce to an ounce of liquid petrolatum. In some cases an emulsion of liquid petrolatum gives more satisfactory results, and the best results are often obtained from the use of petrolatum which melts at the temperature of the body.

4. Abdominal massage and special exercises for developing the abdominal muscles.

5. In very obstinate cases the patient takes, three or four times a day, a couple of tablespoonfuls of bran and as much fruit as he can eat. Fresh and stewed tomatoes are found to be especially useful. Lettuce and celery may also be used freely. The patient is allowed to take fruit between meals or whenever he feels inclined to do so. For persons suffering from hyperacidity, non-acid fruits, like bananas, pears, white cherries, and melons, are used. Occasionally it is found advantageous to make the diet consist wholly of green vegetables, raw and cooked, with bran or agar-

agar. This regimen will usually clean off the tongue and get the bowels moving two or three times a day within four or five days. Occasionally the regimen must be continued for a week or ten days. When mechanical obstacles to bowel actions, such as prolapse of the pelvic colon and adhesions or other obstructive lesions, are **not** present, this method will very rarely fail.

6. At first it is occasionally necessary to use an enema at 80° F. once a day. The patient should be required to go to stool on rising in the morning and after each meal.

7. In cases of colitis with a spastic condition of the descending and pelvic colon, the colon is treated by means of hot saline enemas, and afterward there is introduced into the colon, with the patient in the knee-chest position, several ounces of a liquid culture of *Bacillus bulgaricus* and *Bacillus bifidus*, to which is added a small amount of malt sugar and boiled starch, the purpose being to change the character of the bacteria growing in the colon and thus encourage the healing of the infected mucous surface.

8. In cases in which the lower colon has lost its normal sensibility, various stimulating applications are made, among the most useful of which is the electricity applied to the upper part of the rectum or pelvic colon by a bipole electrode; very weak solution of hydrogen peroxide (0.25 per cent); solution of citric acid (from 0.25 to 0.5 per cent); and a mixture of equal parts of carbon dioxide and pure oxygen gas (from 200 to 500 Cc.).

9. In cases in which the mucous membrane is atrophied as the result of chronic proctitis, it is found very advantageous to introduce into the lower colon at night 3 or 4 ounces of a preparation of petrolatum which melts at the temperature of the body. Such a preparation may be made by melting together equal parts of liquid petrolatum and paraffin.

10. The wet girdle worn at night and a variety of other hydiatic procedures are

also found highly useful in dealing with stubborn cases of constipation.

Too much cannot be said in favor of bran and liquid petrolatum used in combination. One supplies bulk, which is necessary to stimulate the sluggish colon, and the other furnishes lubrication, which is required on account of loss of the normal mucus due to degeneration of the mucous membrane which results from chronic infection.

The last ten years will be known in medical history as the colectomy era. The introduction of the Roentgen ray has opened the way for exploration of the colon, as well as the stomach and other viscera. The time has come to call a halt on colectomizing and short-circuiting operations. Many hundreds of stomachs and colons have been "fixed," "pleated," "suspended," "short-circuited," "resected," etc., in many cases only because the Roentgen ray showed prolapse or "kinks," or "folds," or suspicious shadows of some sort. Larger experience is making clear the danger of too much intermeddling with nature's cunningly contrived and delicately constructed mechanism. The Roentgen ray has demonstrated that prolapse of the stomach and colon are not indications for surgical intervention. Lane's kink is definitely proved to be a consequence of intestinal stasis and not the cause of this condition. The movable cecum is not a pathologic state but a condition essential to the physiologic functioning of the colon.

Except in cases in which actual and severe mechanical obstruction exists, surgery is not indicated. By the liberal use of bran and liquid petrolatum in conjunction, not in succession, and the skilful use of a "fruit regimen" followed by a properly regulated low protein diet, practically all cases of intestinal stasis may be cured, excepting only the rare cases in which Roentgen examination shows actual mechanical hindrance.

Kellogg is convinced that the sober second thought of experienced surgeons, by which the value of every new surgical procedure

must sooner or later be determined, will demand such modifications of the Lane operations, short-circuiting and colectomy, as will relieve them of their most objectionable features and will restrict the use of these surgical measures to extremely rare and exceptional cases.

THE IMPORTANCE OF DUODENAL ALIMENTATION IN SEVERE DYSPEPSIA OCCURRING AFTER GASTROENTEROSTOMY.

In the *Medical Record* of June 16, 1917, EINHORN after pointing out that gastroenterostomy is the most frequent operation performed in organic disease of the stomach and duodenum states that not rarely after the operation the patient manifests a new train of symptoms which sometimes are just as severe as if not more so than those existing before the operation. Peptic ulcers in the stomach or jejunum in the vicinity of the new stoma, or adhesions, are the most frequent conditions causing the new disturbances. The most prominent symptoms encountered are pains, vomiting, and hemorrhage. Usually it is possible by a thorough examination and careful handling of the situation to ameliorate the symptoms. Liquid diet, large doses of bismuth, and washing the stomach play an important part. Occasionally, however, all these measures fail, and we are then at a loss to know what to do. Many of these patients have to undergo another operation, frequently with an indefinite result as to the future.

It is in this class of cases that Einhorn has frequently found duodenal (or, more correctly, jejunal) alimentation to be of great benefit, and he therefore considers it of interest to discuss this subject.

Whenever we have to deal with post-operative dyspeptic symptoms of a graver nature, it is best to make a thorough analysis of the case with regard to gastric secretion and food retention. Examination with the duodenal bucket is here of great importance. The string attached to the bucket shows whether there is a patent

opening leading into the duodenum or jejunum, whether there be ulceration at the stoma, and ultimately whether the bucket has passed through the pylorus or through the new opening. The presence of blood-stain on the string below eighteen or nineteen inches speaks for ulceration near the stoma. If a yellow coloration (bile) appears on the string, beginning at about twenty-three inches or further down, it usually indicates that the bucket has passed through the pylorus. If the yellow discoloration begins at nineteen or twenty inches, it indicates that the bucket has passed through the new opening—for the distance from the cardia to the new stoma is much less than to the pylorus. Should there be a yellow discoloration on the string up at sixteen or seventeen inches, then we remain in the dark as to the patency of either the pylorus or the new stoma. We only know that there is a regurgitation of the intestinal contents with bile into the stomach, but we are in doubt as to how far the bucket has gone. In order to clear up this point, x-ray examinations with bismuth will be required.

In all cases in which the duodenal bucket has reached either the duodenum or the jejunum, treatment by duodenal or jejunal alimentation may be tried. This procedure gives complete rest to the stomach and pylorus, or the new opening, respectively, and so serves to ameliorate the condition.

SOME MISLEADING MEDICAL FADS OF THE TIME.

The *New York Medical Journal* of June 16, 1917, contains an article by ROBINSON in which he says that not many years ago we were overridden by specialists who extirpated ovaries and tonsils. Dr. William M. Polk, of New York, stopped the former operation in a measure, and Dr. John N. Mackenzie, of Baltimore, ended the latter. Operative attacks on appendices still prevail, however, and will do so, no doubt, as long as doctors ignore inflammation of the cecum and continue present methods of

medical treatment. To Robinson's mind these are frequently very bad compared to former procedures. Opiates and warm poultices with high enemata, rest, and liquid diet brought many patients around who are now daily sacrificed to the ready knife. If they survive the unnecessary operation, as of course they will usually, they suffer from adhesions, recurrent pains, and attacks of intestinal dyspepsia which they would not have if the appendix were still present to carry on its physiological rôle, which is surely important, although only acknowledged by a few.

Hardened arteries and high blood-pressure with the daily use of sphygmomanometer and the misinterpretations of its adepts are a source of great anxiety to many. Why not allow the old man or woman to grow old gracefully and kindly and not be tormented by one of the latter-day evidences of contracted mental vision? The heightened blood-pressure and the arterial condition are interdependent and preservative in many instances and should not be interfered with by foolish theories and practices.

The old-time practitioner knew well that to empty the bowels regularly and sufficiently by suitable purgatives or laxatives was rational and desirable, and he usually insisted upon it in his daily rounds. He did not fill up the belly of the sufferer with mineral oils or find it necessary to recur to most ill-advised laparotomies to get rid of kinks and ptoses. Carminatives and a simple diet, with an occasional day of relative starving, would cure many, many dyspeptics. It is not essential to cause further distress by ordering large doses of insoluble bismuth to be swallowed for diagnosis, which not seldom causes conditions afterward interpreted by the *x*-ray to be pathological when they were merely the result of unwise, wrong interference. Teeth which cannot be filled and cause continuous trouble or pain should be extracted, but every ailment of the human body, from headache to gall-stones, cannot be explained by the teeth, and these should not be taken

out because erroneously they are considered the *fons et origo* of morbid symptoms. The science which makes and continues a Rockefeller Institute is great and good with proper limitations, but because a man can experiment knowingly upon a dog, a monkey, or a guinea-pig, does not prove to Robinson's mind that he is the man he wants when he is ill. Give him, he begs, the old-fashioned general practitioner with much experience in human ailments, a modicum of common sense, and a genial, sympathetic heart and mind, and every time, when possible, he will get the better of his bodily or mental ailments.

[Dr. Robinson is evidently inclined to adhere to the older methods of therapy.—Ed.]

CHESTNUTS AND ACORNS IN WAR SERVICE.

The *Lancet* of June 16, 1917, in an editorial reminds us that the manufacture of modern munitions has so far implied a certain demand on cereals which otherwise could be used for food. This is an unfortunate diversion, and it is gratifying to learn that, instead of using cereals, other materials not so far made fit for human food, as, for example, the common horse-chestnut, are to be employed. We may point out similar possibilities in regard to the acorn, vast quantities of which are wasted every year. The composition of these nuts has something in common, as will be seen from the following figures: Horse-chestnut—water, 38.9 per cent; protein, 4.8 per cent; fat, 4.6 per cent; carbohydrate, 50 per cent. Acorn—water, 6.3 per cent; protein, 5.2 per cent; fat, 43 per cent; carbohydrate, 45 per cent. The most important constituent of both is the carbohydrate, in the form of starch, while the acorn should have further value on account of the substantial proportion of fat which it contains. Neither nut has as yet been used to any extent for human consumption, and it is possible that their utilization in some way or other, whether for food purposes or not, may be one of

the results of the relative food shortage. The first step has now been taken in the substitution of these nuts for cereals in the production of munition agents. Other abundant vegetable products may also be pressed into service. It is, of course, possible to convert wood, linen, cotton, and the like into sugar, but the process of conversion does not appear to have attained practical dimensions or to have reached an economic stage.

GASTRIC CRISES OF CEREBROSPINAL SYPHILIS.

The *New York Medical Journal* of June 16, 1917, quotes LYON as stating that the treatment may be divided into the management of the acute attack and the treatment of the intercurrent periods. During the acute attack treatment consists of absolute rest in bed, abstinence from oral feeding, continuous lavage, administration of anti-spasmodics, such as atropine and belladonna, to overcome spasm, supplemented by a mechanical maneuver directed to stimulate the spinal nerves, to overcome a vagotony which gives rise to acute dilatation of the stomach. This is especially emphasized. For relief of pain he advises a trial of adrenalin chloride intramuscularly with final recourse to morphine. During the intercurrent period the patient's health should be built up in the attempt to prevent or abort further attacks. Rest, hygiene, and hyperalimentary diet, tonics, and above all the intensive use of antisyphilitic therapy by intramuscular, intravenous, and intraspinal routes, should be used.

THE BENEDICT TEST.

BRIGHAM in the *Boston Medical and Surgical Journal* of June 14, 1917, reminds us that since the introduction of the Allen treatment for diabetes, more and more patients are being educated in the method of testing their urine, which allows them to watch themselves more closely, and better results are naturally obtained. As a

result many drug concerns are making the Benedict solution, which, on account of its being a single solution, is much easier for patients to use.

Recently Brigham has had two instances where the Benedict solution was absolutely unreliable, and for that reason it seems wise to let the medical profession know in order to avoid any serious mistakes. The following, a copy from the card published by Thomas Groom & Company of Boston, and gotten up by Dr. E. P. Joslin, is an exact copy of the card which is given by Dr. Joslin to his patients, giving the correct prescription for the Benedict solution and detailed directions for testing the urine:

FORMULA AND DIRECTIONS FOR THE BENEDICT TEST.

Copper sulphate (pure crystallized).... 17.3 g.
Sodium or potassium citrate..... 173.0 g.
Sodium carbonate (crystallized)*..... 200.0 g.
Distilled water to make.....1000.0 Cc.

*One-half the weight of anhydrous salt may be used.

The citrate and carbonate are dissolved together (with the aid of heat) in about 700 Cc. of water. The mixture is then poured (through a filter if necessary) into a large beaker or casserole. The copper sulphate (which should be dissolved separately in about 100 Cc. of water) is then poured slowly into the first solution, with constant stirring. The mixture is then cooled and diluted to one liter. This solution keeps indefinitely.

For the detection of glucose in the urine, about 5 Cc. of the reagent are placed in a test-tube and 8 to 10 drops (not more) of the urine to be examined are added. The mixture is then heated to vigorous boiling, kept at this temperature for about two minutes, and allowed to cool spontaneously. In the presence of glucose the entire body of the solution will be filled with a precipitate, which may be red, yellow, or greenish in tinge. If the quantity of glucose be low (under 0.3 per cent) the precipitate forms only on cooling. If no sugar be present, the solution either remains perfectly clear or shows a faint turbidity that is blue in color, and consists of precipitated urates. The chief points to be remembered in the

use of the reagent are (1) the addition of a small amount of urine (8 to 10 drops) to 5 Cc. of the reagent, this being desired not because large amounts of normal urine would cause reduction of the reagent, but because more delicate results are obtained by this procedure; (2) vigorous boiling of the solution after addition of the urine, and then allowing the mixture to cool spontaneously; and (3) if sugar be present the solution (either before or after cooling) will be filled from top to bottom with a precipitate, so that the mixture becomes opaque.

It is often convenient to perform the test by placing the tube containing the mixture of the solution and urine in bubbling, boiling water, where it must remain with the water actually boiling for five minutes.

HEADACHE OF OCULAR ORIGIN.

Writing in the *Cleveland Medical Journal* for August, 1917, BRUNER says that we usually think of a headache which a patient has upon awakening in the morning as probably not being of eye origin; certainly it is true that headaches from eye-strain are more apt to come on after the patient has been up for a time, or toward the latter part of the day, or after some use of the eyes for close work or a trip down town. But a morning headache is not uncommon after an evening at the theater or moving picture show, or after some use of the eyes for close work the preceding evening.

Ocular headaches may be due to an error of refraction, or failure in the power of accommodation, as in presbyopia, or the lack of muscular balance, or simply weakness of the extra-ocular muscles. Inequality between the two eyes is a very common cause. In reference to the relative frequency of the various types of refractive error as a cause of headaches, myopia is least apt to produce them, while astigmatism, hyperopia, or hyperopic astigmatism is a more frequent cause. One very im-

portant point to bear constantly in mind is that it is often the slight error of refraction which produces headache and other reflex disturbances, while the high errors which greatly impair vision may cause little or no discomfort. Therefore, to test a patient's vision and conclude because he reads the normal and standard line that the eyes themselves are normal and are not the cause of the patient's headache, is often a grievous error. And likewise the mere fact that he has normal vision with the glasses which he may already be wearing is not proof in itself that the glasses are correct. In many instances, Bruner has obtained complete relief in patients in whom the ocular defect was so slight in amount, or the change in glasses so small, that he frankly told them that he considered it very doubtful whether the eyes would account at all for their discomfort. In some of these patients Bruner's doubts have been verified: the glasses have afforded no relief, but in so many instances has the correction of these slight defects afforded marked or complete relief that in doubtful or suspicious cases glasses are at least worth a trial. Small degrees of astigmatism at unsymmetrical axes in the two eyes or at certain particular axes are especially apt to produce headaches entirely out of proportion to their amount. Relief in many of these cases will come only when the patient wears the glasses constantly, and that, too, even though the glasses make no improvement whatever in vision. Let us get away from the idea that glasses are needed when they improve vision.

It is scarcely necessary to emphasize the importance of testing the refraction under a mydriatic. Too often the laity will go for glasses to an optician, whose office or store is now decorated with various diplomas and State certificates, which serve the more readily to confuse the ignorant or innocent public, and because these glasses do not afford relief they conclude that the headaches are not due to the eyes.

Accurate refraction work cannot, in

Bruner's opinion, be done in patients under forty-five, except in occasional instances, without complete cycloplegia, and frequently this procedure is necessary even beyond that age. Personally Bruner does not believe in the use of homatropine for children, but thinks that the more thorough and prolonged action of atropine is much preferable and more accurate.

Beginning presbyopia, or failure of accommodation because of age, is a very frequent cause of headaches, and such patients often have much trouble in getting accustomed to glasses or to the addition to their distant correction.

Weakness of the muscles or lack of muscle balance is also a frequent and very troublesome source of discomfort in patients whose eyes are otherwise normal or whose glasses perfectly correct their error of refraction. Such imbalance may call for prisms, for gymnastic exercises, and in rare, very rare, instances for operation upon the muscles.

The type of headache due to eye-strain varies greatly. Not a few of the so-called bilious headaches are of eye origin. Some neurologists and even some oculists have claimed that true migraine is not produced by eye-strain. Bruner confesses that he always feels more uncertain about obtaining relief by treatment of the eyes from attacks of migraine than from other types of headache, but he is equally certain that he has in not a few instances seen marked improvement both in the frequency and severity of the attacks and even complete cessation of them follow treatment of the eyes.

Eyes are at times kept in an irritable and sensitive condition by reflex disturbance from some other cause, such as an apical abscess or an impacted tooth or an abnormality in the nose, or sinusitis, some intracranial condition, some pelvic abnormality, or a chronic toxemia of gastrointestinal origin, so that the patient will suffer from headaches following the use of the eyes; but glasses, even though needed, will afford no relief or only partial relief until this

condition is corrected. We also unfortunately occasionally encounter patients who will suffer headaches from an overuse of the eyes despite everything that can be done for their eyes. They possess hypersensitive eyes, or their weak eyes are simply a part and a symptom of a very sensitive general nervous system. The general practitioner must remember that the oculist cannot put strong eyes in a weak body, and the oculist must not forget that he needs the coöperation and help of the general practitioner. Again and again has Bruner seen patients who gave a history of ocular headaches beginning after a serious illness or operation. The refraction had not been changed by the illness or operation, but their power of endurance or their ability to overcome a slight defect had been loosened, and temporarily at least they may need help; or in other instances they should be forbidden the use of their eyes until they have more fully regained their general strength. Overuse of the normal eyes or of eyes properly corrected with glasses may cause ocular headaches, and especially is this true if the use is under unfavorable conditions, as poor light or artificial illumination. Some persons can endure more physical or nervous strain than others; the same is true of eyes. Then, too, most individuals at fifty or beyond cannot endure as much as they could at twenty-five or thirty, and this applies to their eyes as well as the rest of the body. Some eyes are not adapted to hard usage or will not stand the amount of use which another pair can endure with perfect ease. Eyes with pathologic defects, as corneal scars, or opacities in the lens, may continue to cause headaches despite everything we can do for them, and the same is true of eyes with irritable or inflamed retina or choroid or optic nerve.

Given a pair of irritable eyes, it is not sufficient merely to give that person glasses, or take care of their muscles; treatment of the eyes locally and by internal medication may be necessary before that person will obtain ocular relief. We cannot judge of

the value of glasses in many instances by the immediate effect. While one person may adjust himself to glasses or a change of lenses almost immediately, in another person it may be weeks or even several months before the full benefit is obtained.

Lastly, we must not forget that the treatment of headaches is not infrequently a process of elimination as to the etiology. In the same person may exist several conditions, any one of which may produce headaches, and one by one these defects must sometimes be remedied before we arrive at the real cause; or in other patients it is a combination of several causes that produces the discomfort, and relief will not be attained until all the pathologic conditions have been rectified. Whatever our special line of work or interest, we must not forget that first of all we are or should be general physicians.

DIGITALIS: ITS PROPER PLACE IN MEDICINE.

IVES in the *New York Medical Journal* of June 16, 1917, insists that the effects of the drug are dependent upon the nature of the lesion for which it is given. Clinical experience for ages has proved its beneficent action upon some patients, and a strange lack of response in others. This mystery is now rapidly being unveiled, as the combined studies of clinicians and laboratory workers prove the selective action upon certain forms of cardiac disturbance and an absolute lack of action in others. The myogenic theory of cardiac function is the key to the solution of the pharmacology and the clinical application of the drug as a remedy.

Certain laws directing its clinical use are now established: (1) The reaction to digitalis is far less effective when the rhythm is normal than when auricular fibrillation is present. (2) Whenever the heart is affected by toxins or agents which increase excitability, digitalis has little effect upon the rate, whether there is auricular fibrillation or whether the rhythm is normal. Thus

in tuberculosis, typhoid, malignant endocarditis, rheumatic endocarditis, alcoholism, etc., the above holds true. (3) Experience shows that in auricular fibrillation, especially where there is a large amount of healthy heart muscle, rather than when extensively it is diseased, the reaction to digitalis takes place. The most marked response is found, therefore, in the youthful type of the disorder with a rheumatic history. When fibrillation occurs in the senile heart, especially in the absence of a rheumatic history, the failure to respond is very common. (4) It is important to realize that digitalis at times so affects the conducting bundle of His as to depress it, with production of partial heart block. (5) Digitalis proves of inestimable value in restoring muscle tone or, more properly speaking, the property of tonicity, in myocardial relaxation, especially when resulting from fibroid replacement occurring after the acute toxemias. The responsiveness of the heart to the drug indicates relatively the percentage of good cardiac muscle still present, for with lesions affecting its efficiency it is hopeless to expect a complete recovery of the strength exhibited by a healthy heart.

Physiologically, then, we base our expectations upon the following actions of digitalis: (1) It acts on the cardiac muscle, the intrinsic cardiac nerves, and the vagus center in the medulla. (2) It has some contractile action over the arterioles generally, but while contracting the vessels in the splanchnic area it seems to dilate those of the kidneys. The increased kidney secretion may result without a material rise in the blood-pressure. (3) Its action on the vagus slows the pulse-rate, and the diastolic period is made more complete. (4) Its specific inhibitory action over the conducting auriculoventricular bundle of His checks the discordant impulses arising in the auricle, thus slowing the ventricular rate in cases of auricular fibrillation and flutter. (5) Its selective action upon the musculature makes the contractions more powerful, its beats become more efficient,

the diastolic pauses become prolonged, and an increased volume of blood is thus delivered at each systole. (6) Through its action upon the musculature it increases the nutrition of the heart itself by forcing a greater volume of blood through the coronary circulation. Dilatation is lessened by the restoration of toxicity; the muscular rings about the auriculoventricular orifices contract more strongly; the mitral and tricuspid valves close more efficiently, thus lessening regurgitation. (7) Digitalis improves the tone in the arteries and veins through the auto-massage of the vessels as a result of the slower, stronger beat. The increased suction of the muscular contractions of the heart aids the circulation in the vessels. The diminished regurgitation, combined with the increased circulation in the veins, lessens venous congestion, and because of its action over the kidneys increases the secretion of urine. (8) Brunton recognized the diuretic action of the drug in four ways: It dilates the renal vessels and increases the pressure in the glomeruli; it lessens the resistance which the pressure of distended venous radicles in the kidney opposes to secretion; it stimulates the secreting cells directly; it increases the volume of the blood and somewhat alters its composition by causing absorption from edematous tissues and serous cavities. When it causes absorption of ascitic fluid from the abdominal cavity, it may act as a diuretic also by lessening the resistance opposed to the secretion of the urine by the pressure of the ascitic fluid on the kidneys themselves and on the ureters.

A word should be said on the tendency of digitalis to raise blood-pressure, as much undue anxiety prevails among the profession. The fear of increasing the burden of the heart already laboring against high pressure by raising the pressure by the use of the drug is unwarranted. Such a fear is wholly without foundation, for the consensus to-day recognizes that in the proper medicinal doses the drug does not affect the arterial walls, or, if it does, the effect is so slight as to be negligible.

RETROVERSION OF THE UTERUS AND OBSTETRIC PRACTICE.

JACKSON in the *Indianapolis Medical Journal* of August 15, 1917, asserts that the treatment of this condition consists in replacement of the uterus and maintaining it in its corrected position either by a mechanical support or by surgical operation.

Contrary to the general belief the care of patients postpartum is of much greater importance than that of the delivery, and it is the neglect of this duty which causes most of the invalidism following confinement. These patients should be examined carefully at intervals of a week for at least eight weeks after delivery. The touch in the early weeks may be made per rectum if one is not absolutely sure of aseptic conditions, and Jackson believes this should really be the general rule.

When discovered early in the puerperium much can be accomplished in the relief of retroversion by the judicious use of ergot to increase muscular tone and by posture, either by the Sims position, left latero-prone because of the relation of the sigmoid, or the knee-chest position, the choice being indicated by the general condition of the patient, the uterus having first undergone reposition. Here Jackson remarks, parenthetically, that these postures are a part also of the regular exercises to be mentioned in considering prophylactic care. Hot aseptic or mildly antiseptic low pressure vaginal douches are also indicated, and sterile glycerin wool tampons may be used for support and depletion of the tissues.

Later—that is, after the third week—a properly fitting pessary should be introduced to aid the maintenance of the normal uterine position and to favor, in so doing, the general involution of the pelvic structures.

There is no doubt that a properly fitting pessary of the Smith or Hodge type will maintain the uterus in position and in the majority of cases effect a permanent cure—that is, of course, when used in these puerperal cases.

Reposition must always be accomplished before attempting the introduction of a pessary. This sometimes offers considerable difficulty and may demand postural aid such as the knee-chest or Sims position. Jackson has found many very difficult cases comparatively easily corrected by grasping the cervix firmly with a tenaculum forceps and drawing it sharply forward, while two fingers of the vaginal hand were spread apart sufficiently to hold firmly back of the lateral ligaments as a fulcrum and permit the cervix to be shoved back between the fingers.

As regards the use of the pessary, Jackson believes it is too generally condemned, or at least ignored. It is certainly of great value in all of these puerperal cases, and he has found it very serviceable in many, if not the majority, of the ordinary gynecologic cases, and never hesitates to use it wherever operation for any reason is not to be entered into. He has seen, although he does not claim it to be possible in a great percentage of cases, a cure of retroversion in a virgin nullipara, and all of us who have the patience and mechanical skill to properly apply the instrument have seen cures in many cases, and symptomatic cures, *i.e.*, comfort while continuing the use of the pessary, in practically all cases in which it is once successfully placed. That there are many patients suffering from this condition who will not submit to operation for reasons more or less valid we all know. Such cases should have the benefit of an earnest effort at pessary support.

This fact is borne out by VanTeutem's observation in the Leyden Clinic, where in a series of cases 407 were treated with pessaries as against 344 operated on. G. Gibson treated sixty women of the outdoor clinic who were the subjects of "movable retroversion without other lesions and those with other lesions not in themselves demanding operation," and in concluding his discussion says: "These results show that much can be done by this much-abused method of treatment." Jackson's observation in three months at Broese's Dispensary

Clinic in Berlin bears out this same argument; that is, many if not the majority of these gynecologic patients can be relieved by the proper mechanical support. The test in these cases in out-patient clinics is more crucial than in general practice, inasmuch as these are women of the working class, under-nourished and overworked.

Both skill and patience are necessary to the fitting of the pessary. It must be graded to the right size and shaped to properly support. It must not only produce no pain but no sensation. Jackson's stock question to these patients is, "Do you feel anything? Would you know if I did not tell you that anything was there?" It is not a question of pain but of any sensation of touch or pressure. One must also bear in mind the dangers of local irritation with consequent decubitus and inflammation. Hence the importance of the symptoms pain and leucorrhea, and careful supervision of the patient.

Cervical injuries demand repair whether observed in the puerperium or later in the gynecologic examination. They are causative factors, both as atria for infection which may produce adhesions, drawing the uterus into the cul-de-sac, and also by widening the central attachment of the uterine ligaments, thus shortening the distance between their two points of attachment with resultant relaxation.

It is impossible within the scope of this paper to treat to any extent a question of operative correction of uterine retroversion. That there have been more than seventy original methods or variations in technique described, all depending upon differences of mechanical conception of the importance of this, that, or the other anatomic structure in maintaining the forward position of the uterus, is sufficient evidence of its vogue and desirability. There is little difference in the principles of the more modern of these, for example, the Baldy-Webster and the Gilliam operations, and most operators use one or the other of these with or without unimportant modifications in technique. One of the latter, which Jackson wishes to

suggest as of possible importance, is the use of a non-absorbent and non-absorbable suture material such as Pagenstecher linen upon the ligaments rather than catgut. The current strife in regard to the function or not of the round ligaments normally as supports is hardly pertinent when all are agreed that they may be converted by careful surgery into supports or "guy ropes" so far as maintaining the anterior position of the uterus is concerned. Jackson has also found that pessary or tampon support sometimes aided in the after-care of operative cases within the first six or eight weeks.

In closing Jackson desires to make acknowledgment that there is little new in this presentation of an old subject, but he also wishes to emphasize the propriety and timeliness of its plea for "better obstetrics," or, in other words, more careful gynecologic prophylaxis, for this is the gentle art which preserves the health and comfort of mothers.

EMETINE HYDROCHLORIDE: A NOTE CONCERNING ITS INTRAVENOUS ADMINISTRATION.

In the *Southern Medical Journal* for August, 1917, LARIMORE states that the intravenous use of emetine would apparently give more adequate concentration of the emetine in the circulation. It obviates the soreness which follows the subcutaneous, and also, in a less degree, the intramuscular injections. This, however, is not so severe as unduly to favor intravenous administration. Its avoidance, however, facilitates the handling of certain types of patients. If emetine injected in any manner is adequately concentrated by the selective excretory faculty of the gastrointestinal mucosa, it is not necessary to secure its greater concentration by the intravenous injection. However, this selective excretory faculty is only presumptive and it is doubtful if it is exercised by the hepatic parenchyma or by the gums, and in the use of emetine for infection at these sites intravenous injection would seem to

be more efficacious. After several injections there was noted in a few cases an arterial hypotension. A few cases gave no subjective reaction until after several doses, suggesting a cumulative action.

The intravenous administration of emetine in one-grain doses undiluted and rapidly injected, without serious or even inconveniencing symptoms, would indicate that it is a safe procedure.

THE PRESENT STATUS OF PHYSIOLOGICAL THERAPY.

The *New York State Journal of Medicine* for August, 1917, claims that hard and fast lines between functional and organic disturbance is now fast disappearing. The recent work of Cannon has shown that chronic emotional stimulation in nervous individuals may be the cause of many organic conditions. Cannon, in a recent book on "The Bodily Changes in Anger and Fear," has proven that there is an increase in adrenalin produced as a result of stimulation of the sympathetic system. He has shown that in emotional stress in case of struggle, such as in athletic contests, sugar is found in the urine, due to excessive secretion of adrenalin, which in turn causes the liver to throw out more glycogen than the system can take care of, and shows as sugar in the urine. This work is opening up an entirely new field.

Levy has recently treated a case which shows most beautifully the close relationship between the different endocrine glands. This patient was a woman who was referred to Levy by the late Dr. Elsner, suffering from a large fibroid, with tremendous hemorrhages. She was referred for x-ray therapy for the treatment of fibroids. This woman was a school-teacher of nervous temperament. She consulted Dr. Jacobson five years ago. Sugar was found in the urine, no doubt due to an extensive stimulation of the adrenals, due to depressing emotion. On being told that she had glycosuria and that she must be careful of her diet she was greatly shocked and developed

an exophthalmic goitre, which was treated by Dr. Tinker. Later she developed the fibroid with enormous hemorrhages, due to a perverted function of the ovaries. In this case we had a perverted function of the adrenals, causing glycosuria, later a perverted function of the thyroid causing hyperthyroidism, and then a perverted function of the ovaries which produced the fibroid and the hemorrhages.

A neurasthenic, as the result of an emotional shock, may develop either diabetes, or hyperthyroidism, or climacteric hemorrhages, or cardiovascular changes, or a combination of these. Surgeons are beginning to realize the necessity of treating the neurasthenic basis in many organic conditions; the necessity of rest before the operation in exophthalmic goitre cases and of rest after the operation, and the realization that the exophthalmic goitre is only one of the symptoms. This is also illustrated in cases of climacteric hemorrhages. The old theory was that they were due to endometritis, and that curettement would cure them. Now we know that these cases always develop in neurasthenic individuals in whom there has been excessive stimulation of the ovaries which results in a perverted function, and as the trouble is not in the uterus primarily curettement does not cure it, but the primary condition is a perverted function of the ovaries, producing a hormone which prevents coagulation of blood.

Perhaps the most remarkable therapeutic agent developed in the last few years is the use of the gamma ray in cases of fibroids. The time is not far distant when simple fibroids, especially in women over forty, will no longer be considered a surgical condition, but will be treated by means of the gamma rays. They can be treated not only symptomatically but clinically, for in many of these cases the tumor disappears entirely. Levy has treated over thirty cases by means of the gamma ray, and has produced a cure in 90 per cent of them.

The use of physical therapy has greatly increased since the Compensation Act has

gone into effect, as the insurance companies are anxious to get the injured back to work as soon as possible, and we can greatly shorten the period of convalescence by these methods. While a good surgical result is necessary it is more essential to get a good functional result, and in a great number of cases the physical agents are a great benefit and aid to us in the after-treatment of fractures and injuries. One of the most common and one of the worst complications is adhesions, resulting from trauma or infection. There have been some advances that have been made recently in the treatment of these conditions which Levy would like to bring to our attention. Baking and manipulation have been known for some time and are extremely valuable, but these often fail, and in obstinate cases ionization is useful, saturating the negative pole with 2-per-cent solution of potassium iodide. It is often necessary to resort to the hard rays of the Coolidge tube to aid in softening the adhesions. By the use of the various physical agents, such as baking, massage, exercise, ionization, and the use of the hard rays, he has had some surprising results. Recently a very instructive case came under his observation. Dr. Pritchard sent Levy a man who had suffered a severe injury to the thigh, which left his foot cold and clammy. There was a marked disturbance in the circulation and the foot became devitalized. He was sent to Levy fourteen months after the accident, and within three months Levy was able to improve the circulation and bring back life to the limb by means of baking, massage, and various forms of electrical currents. He was so much improved that he was able to return to work, and has been working ever since.

In the after-treatment of these compensation cases it is necessary to get the confidence of the patient, showing him that we are working for his benefit, and we must make him understand that he will have a certain amount of aches and pains as a result of his injury for some time, but that these are not severe enough to

interfere with his work, and the sooner he returns to work the better he will be and the quicker he will get well. A great many of these individuals are satisfied with two-thirds of their wages without working, and they are very likely to exaggerate every sensation. Levy never tells them their ailments are imaginary, for this would make them angry, but he tells them they are looking at their troubles through a microscope, which greatly exaggerates them and makes them appear more severe than they really are. It often takes a great deal of encouragement and a great deal of persuasion to have them even try to work, especially in cases of men over fifty who have been out several weeks. A fact in regard to the after-treatment of fractures and injuries which it is necessary to recognize is the danger of firm adhesions developing, especially in elderly people or people of lowered vitality. It is best to treat adhesions conservatively before breaking them up under an anesthetic, by baking, manipulation, ionization, for this makes the part more flexible and there is less danger of tearing blood-vessels, producing a new fracture, or causing such marked reaction that more harm than good is done.

ON THE USE OF SMALL DOSES OF PITUITRIN FOR INDUCING AND SHORTENING LABOR AT TERM.

STEIN and DOVER in the *Medical Record* of August 11, 1917, state, upon the basis of their personal experience, that they are led to indorse: (1) The use of pituitrin in far smaller doses than the customary ones. (2) The use of small dosages of pituitrin in the first stage of labor as well as later on. (3) The use of small dosages of pituitrin for the induction of labor at term.

Small Dosages of Pituitrin During Labor.—Their claims are based on personal observations in sixty-four cases in which pituitrin in form of the Parke-Davis product was employed during the labors

of forty primiparæ and twenty-four multiparæ. The pituitrin was always injected intramuscularly, as this was found to be a safe and highly efficient method of administration.

The usual dose consisted of two to three minims, far less than the smallest dose reported to their knowledge by most contributors to the obstetrical literature. A tacit agreement has apparently been arrived at among obstetricians making the contents of one ampoule, namely, 1 Cc., the standard dosage for the acceleration of childbirth when the labor pains are sluggish and inefficient as the result of uterine inertia. Judging from the literature, $\frac{1}{2}$ Cc. is almost the smallest amount in which obstetricians, both here and abroad, have been willing to place their confidence.

Aside from the question of dosage, the proper time for the administration of pituitrin has been referred with equal empiricism to the later stages of labor after the os has become more or less dilated and the presenting part has become engaged. In their close clinical observations the uterine contractions set up by minimal doses of pituitrin were of the normal, rhythmical, physiological type, with a gradual rise and fall in intensity.

Pituitrin is now generally recognized as an efficient adjuvant during the progress of labor, although there seems to be an unfounded prejudice against its administration at the onset of labor in the dilatation stage, a period when the drug rendered excellent service in their clinical experience. This prevailing opinion against the use of pituitrin during the early stages of labor is no doubt due to accidents from 1-Cc. doses. By the use of minimal doses they have been enabled to administer it with perfect safety during all stages of the birth process.

A single three-drop dose proved sufficient, in their experience, for the production of efficient labor pains in about one-third of the total number of cases. Where pituitrin was repeated, the succeeding doses of 3 minims of pituitrin were

usually given at half-hour intervals, the average number of small doses in each case being 1.78, with an average dose of 3 minims.

The duration of labor in the forty primiparæ under these small doses of pituitrin averaged fourteen hours, and in twenty-four multiparæ eleven hours. In nineteen cases of this series in which the cervix was fully dilated when the use of pituitrin was begun, the average duration of the second stage of labor was one hour and three minutes. It is unnecessary to emphasize that this means a marked reduction in time of the expulsive stage.

No complications of any kind were noted in the 64 cases of this form of pituitrin administration. The mothers, without exception, did well under the use of pituitrin. Among the 64 infants there were but six still-births, and these were in no way referable to the minute doses of pituitrin, but the result of prolapsed cord and similar causes of fetal death.

In conformity with their own experience, a reduction of the large customary dose (1 Cc.) of pituitrin is recommended by Bandler, Schwartz, Bubis, Friedman, Norris, Druskin, and others. Bandler, for instance, finds one-third of an ampoule of the Parke-Davis preparation an entirely sufficient dose in ordinary labor, subject to modifications according to special requirements in a given case. Norris points out that the usefulness of pituitrin would not be diminished and its dangers would be lessened, if it were dispensed in doses equivalent to half the customary ones. Small doses of pituitrin are credited by Friedman with a greater efficiency than large amounts for stimulating the activity of the uterine muscle. Bubis likewise indorses the use of small doses of pituitrin, and he also points out that the drug may be administered in any stage of normal labor, where it will shorten the birth process from two to twelve or more hours.

There is no reason, in the opinion of Bandler, why the use of pituitrin should be delayed until the second stage has been

reached. These views are well borne out by their personal observations on the largest series of cases on record in which pituitrin in minute doses has been employed as a routine medicinal agent in the management of ordinary labors. The freedom from complications and the shortening of the duration of labor certainly illustrate the efficiency of very small doses.

The employment of intramuscular injections of small doses of pituitrin for the induction of labor at term constitutes the most interesting and important part of their observations. In the cases in which this treatment was adopted (34) it proved successful in one-half the entire number (17), contrary to the statements abundantly scattered through the obstetrical literature to the effect that pituitrin cannot be used to bring on labor before the os has at least begun to dilate. Numerous writers in this country and abroad assert the non-efficiency of pituitrin in the artificial induction of premature labor and abortion (which is also the opinion of the writers), as well as labor at term (a conclusion with which the writers are unable to agree).

In view of the novelty of this plan of treatment, the method adopted at the Obstetrical Division of Harlem Hospital (Chief Dr. Brodhead), and also in private practice of one of the writers of this article (Stein), is herewith given in detail:

At 7 A.M. the woman receives one ounce of castor oil, and two hours later, at 9 A.M., an intramuscular injection of 2 minims of pituitrin, followed at 11 A.M. by a repetition of this dose. If labor pains are elicited, the pituitrin is resumed at intervals of one-half to one hour; if no pains result the treatment is stopped and another attempt is made on the third following day, again administering the same small dosage.

All the mothers in whom labor at term was induced by means of small doses of pituitrin did well, and the infants were invariably born in excellent condition.

In the successful cases, true labor pains usually began after the second small dose of pituitrin, sometimes after the first, or not

until after the third dose. In a typical responsive case concerning a three-para at term, labor pains began after the second dose. At half-hour intervals three other doses were given, making a total of four doses of altogether 9 minims. It agrees with the observations of others that in a certain number of normal parturient women—one-half their clinical material—absolutely no response to the administration of pituitrin for the induction of labor can be elicited.

The recommendation of pituitrin in small doses for the induction of labor at term without auxiliary measures of any kind is decidedly new. Together with the employment of mechanical means, in form of the bag, the use of pituitrin is indorsed for the induction of labor by Bandler, who finds that the repeated injection of pituitary extract often brings on or produces more marked labor pains when administered just as soon as discomfort and suggestive or actual pains begin after the introduction of the bag. In one of their own cases concerning a two-para who was three or four weeks overdue, the introduction of the bag and bougie served as a supplementary measure to a single intramuscular injection of a 2-minim dose of pituitrin. The child was born in short order and in good condition.

TOXIC GASTRIC HEMORRHAGE.

CRISPIN in the *California State Medical Journal* for August, 1917, asserts that toxic gastric hemorrhage is essentially a medical condition. Hemorrhage does not always mean chronic ulcer. Surgery should be resorted to for the calloused type of ulcer, and for this type only will it give the best results. Recognition of the true cause of hemorrhage from the upper gastrointestinal tract is sometimes most difficult. At times evidence will warrant exploration to prove or exclude peptic ulcer as a cause. The presence of a constitutional disease without sufficient evidence of ulcer makes medical observation and study, rather than surgery, advisable. In cases of hemorrhages of

obscure origin, search for infected foci should be made and the possibility of their association with the cause of the hemorrhage should be considered. In addition, studies of blood diseases associated with bleeding, and further studies in blood-pressure, with recognition of transient hypertensive states, will help to define and separate hemorrhages having their origin in surgical ulcer from gastric hemorrhages of acute infective and toxic origins.

FATIGUE AND ALCOHOL.

In the *Lancet* of July 28, 1917, KENT thus concludes a sane discussion of this subject:

It appears, then, that the taking of alcohol has little immediate effect upon the physical side of fatigue, whatever its ultimate result may be. The amount of output may perhaps be increased to a small extent for a time, but the increase soon falls off and is replaced by a diminution. The influence of alcohol upon the psychical side of fatigue is more profound. It leads immediately to a feeling of renewed vigor and increased strength. But here also the effect is transitory, and repeated doses must be taken if anything lasting is required.

If we look at the other side of the question and ask, What is the influence of fatigue upon the taking of alcohol? The answer is clear. Fatigue, as we understand it, involves physical discomfort. The worker knows full well that this discomfort can be diminished by drink. What more natural than that he should turn to it? Because the effect is transitory the dose will be repeated again and again, and industrial alcoholism will be established.

Ordinary drunkenness is diminished amongst us, and we can afford to ignore its occasional appearance if we can destroy the infinitely more harmful industrial drinking. The problem should be placed upon a new basis. It should no longer be regarded merely as an industrial evil to be deplored or to be treated by an appeal to its victims; it is a scientific problem to be solved by an

appeal to the laws of cause and effect. Too long has it been treated with reference to symptoms only. Let it be treated on scientific lines, let the *cause* of intemperance be attacked, and let the attention which the great war has drawn to the lot of the worker bring to him the greatest possible blessing.

The data are sufficient for a solution to be reached. Alcoholism follows industry, but its severity is dependent upon the conditions of industry. Conditions determine fatigue; fatigue induces men to drink. Clearly, therefore, our attack must be on conditions. Where conditions have been improved fatigue and drinking have diminished.

The true cure for alcoholism is the provision of decent surroundings in the factory and in the home, adequate wages, leisure and relaxation, clubs, recreation rooms, indoor and outdoor games—in short, the elements of a healthy, full, and interesting life in place of a mere existence without interest, without pleasure, and without hope.

COMMENTS ON THE TREATMENT OF ECLAMPSIA.

In *Medicine and Surgery* for August, 1917, HOLMES says that a summary of recent opinion on the treatment of eclampsia may be stated as follows: Chloral hydrate 15 grains, with morphia $\frac{1}{4}$ grain. Thereafter the two drugs are exhibited as often as the condition of the patient requires, this depending on the time the effects of the drugs wear off, or on the evidence of recurring aggravation of symptoms. At the same time, such methods are instituted as will tend to secure elimination (catharsis, diaphoresis, and diuresis). When the condition of the parturient canal permits it, then operative delivery should be accomplished. No chloroform should be given; oxygen should be given during the convulsion. How popular the expectant, non-surgical treatment of eclampsia will become, time alone will tell. However, it will have

one beneficent influence in drawing attention to the fact that operative intervention is *not the treatment*, but is merely an incidental detail in what we now know as the treatment.

After all is said and done, at the present time, the therapy of eclampsia is a system of blindly groping in the dark.

THE MODE OF EXISTENCE OF FLIES DURING WINTER.

MCDONNELL and EASTWOOD (*Journal of the Royal Army Medical Corps*, July, 1917) alluding to the fact that most investigators maintain that flies in their fully developed form are hibernating insects, state that careful search has failed to corroborate this theory. The authors believe that eggs which are deposited in manure and refuse dumps in late autumn are the sources from which the yearly "plague of flies" originates, and that the hatched-out larvæ in a dormant state persist throughout the winter and come to the surface in the spring or early summer.

They therefore made a careful investigation of the manure dumps and disused trench latrines. They found in March after a very severe winter that in a heap of old manure living larvæ were found at a depth of three feet. This heap was covered with grass and weeds. Larvæ were also found in human excreta dropped and covered with six inches of earth the preceding autumn, and in similar material covered with two feet of earth. Pupæ which in the larval state had evidently migrated from the manure and excreta heaps were found about two feet from the respective dumps lying at a depth of about one inch below the ground surface. The larvæ were placed under favoring experimental conditions and afterward became fully developed flies.

Larvæ found at a depth of two feet in a manure heap were apparently dead, but revived when exposed to heat; evidently they were hibernating.

These preliminary observations open up a new field of investigation and indicate the

inadequacy of the present hypothesis that the summer "plague of flies" is mainly dependent upon the survival throughout the winter of the adult fly in some suitable nook or cranny.

It would appear that the fly either passes the winter in the pupal stage as do many insects, or that fly larvæ may even have the power of undergoing hibernation with intervals for feeding during the spells of warmer weather. It is known that fly larvæ do not mature for probably several weeks when fermentation of their food supply does not take place. It will be seen, then, that manure heaps will be a source of danger at any time of year, and if the spread of flies is to be prevented, manure should either be burnt, or spread out in thin layers; dumping in the immediate vicinity of camps and buildings should be avoided. Covering over the heaps with earth, or sowing the surface with grass or other seeds, would appear to be of doubtful value once eggs are deposited in the manure.

ANESTHETICS AT A CASUALTY CLEARING STATION.

MARSHALL (*Proceedings of the Royal Society of Medicine*, May, 1917) notes that surgical operations performed at a clearing station are for the most part urgent. It is often imperative to operate on men within a few hours of their injury while they are still suffering from the effects of shock and hemorrhage. The patients have had to travel some miles from the line by motor ambulance over indifferent roads, and many have been exposed to cold and wet. A correct choice of anesthetic is of the first importance: the patient's life will be as much imperiled by faulty judgment on the part of the anesthetist as by a wrong decision on the part of the surgeon. There are other cases in which the condition is rendered grave by sepsis, especially gas gangrene; but there remains the majority whose wounds are slight and whose general condition is good.

The methods of anesthesia the author has

employed are: Ether and chloroform by the open method; ether and chloroform by Shipway's warm vapor apparatus; intravenous ether; spinal anesthesia with stovaine; nitrous oxide and oxygen; local infiltration with novocaine, etc.

The patients have not been prepared for an anesthetic, so that when brought into the theater the bowel is full and often the stomach as well. In winter months difficulty is further increased by the prevalence of bronchitis. A large proportion of the men have cough with expectoration. Autopsies on men who have died of wounds, even when they have had no anesthetic, commonly show the lung tissue to be congested, while there is excess of secretion in the tubes. In spite of these conditions, the lightly wounded are good subjects for anesthesia. They are for the most part young and healthy; they are placid, and have little fear of operation.

The work of a clearing station comes in rushes, so that for slight cases the main considerations are safety, speed, and convenience. The ideal anesthetic is one with which induction is rapid, and recovery complete a few minutes after operation, so that the patient is in fit condition for early evacuation by ambulance train. Apparatus is subjected to much wear and tear, so it should not be complicated or delicate.

Of the anesthetics the writer has used, gas and oxygen meets these requirements best. Its only drawbacks are that the apparatus is somewhat cumbersome and the materials costly. Local anesthesia can only be employed in a small number of cases on account of the multiplicity of wounds and their lacerated and soiled condition. Ether remains the most generally used anesthetic. The great majority of slight cases are anesthetized by Shipway's warm vapor method. For induction the mixed vapors of ether and chloroform are used; the process is free from struggling, so that it is seldom necessary for an assistant to stand by the patient. It is rapid: in a hundred cases which were timed induction was invariably complete in five min-

utes. Anesthesia is maintained with ether alone. There is an absence of secretion, and atropine is not given unless the patient has signs of bronchitis. Consciousness is regained quickly, and vomiting has occurred in only 26 per cent of all cases, including abdominal cases. Since the warm vapor method was introduced in this clearing station last winter, the drop-bottle has passed out of use. Compared with the open method there is a saving of at least 60 per cent of ether. There is much less diffusion of the anesthetic into the atmosphere of the theater. This is an important consideration to those working in it at times of sustained pressure.

In choosing an anesthetic for the more seriously wounded, the one overwhelming factor is safety. A method is required which will not be harmful to a patient suffering from the shock of injury, and one which will minimize the shock of operation. It has been urged that spinal anesthesia would meet these requirements and would therefore be of great value in military surgery. For men wounded in the lower extremities the author found it a convenient and satisfactory method at a base hospital; cases of profound collapse did not occur. The same good results were obtained at a clearing station in all patients who had been wounded not less than forty hours before operation. Of the more recently wounded, however, more than half showed signs of cerebral anemia with great fall of blood-pressure shortly after intrathecal injection of stovaine. It has been stated that collapse during spinal anesthesia is not dangerous. The writer has seen two cases in which it proved fatal, and has heard of a number of similar fatalities in recently wounded men.

It is to the man whose wounds are less than forty hours old, and who has lost blood, that spinal anesthesia is dangerous. This is shown by an analysis of fifty consecutive cases of wounds of the lower extremities operated on at a clearing station under stovaine spinal anesthesia. The drug was used in 5-per-cent solution, in most

cases with glucose. A dose of 1 to 2 Cc. was given; when smaller doses were used anesthesia was incomplete, or came on so slowly as to make the method impracticable at a clearing station. During injection the patient was placed in either the Barker or sitting position, head and shoulders were kept high for the first fifteen minutes, and then horizontal.

Of the recently wounded patients, by no means all collapse under spinal anesthesia. It is important that one should be able to recognize beforehand which cases will tolerate this procedure. Is there any physical sign which will prove a reliable guide? The appearance of the patient is of little assistance, the pulse-rate and blood-pressure do not help us at all. A valuable indication is obtained by determining the concentration of the blood. The method the author employs is to estimate the percentage of hemoglobin in the patient's blood by means of a Haldane hemoglobinometer. This method is simple, sufficiently accurate, and only takes a few minutes to complete. A low percentage of hemoglobin, *i.e.*, dilute blood, in a man recently wounded, may be taken to mean that he has lost blood. Control observations on healthy unwounded soldiers showed the normal range of hemoglobin to be from 97 to 120 per cent, with an average of about 110 per cent, as against the author's standard indicator. In his practice he finds that if a recently wounded man has a hemoglobin percentage of over 100, it is safe to administer stovaine intrathecally. If the reading is below 100 per cent he will almost certainly show a serious fall of blood-pressure and symptoms of collapse. In these fifty cases the hemoglobin percentage, blood-pressure, and pulse-rate were recorded before the injection of stovaine. After injection, blood-pressure and pulse-rate were registered at intervals of about two and a half minutes for less than fifty minutes. The blood-pressure was estimated by means of a Riva Rocci sphygmomanometer with stethoscope over the brachial artery.

As regards the appearance of the patient,

some were obviously pale, but many were not, although estimation of the hemoglobin showed their blood to be dilute. These patients suffered collapse as profound as those in whom loss of blood was obvious clinically. The deduction he would draw from these observations is that stovaine should not be administered intrathecally to men who have been wounded less than forty hours, unless it has been demonstrated that their blood is of normal concentration.

The dose of stovaine varied from 0.05 to 0.1 grm., and within these limits fall of blood-pressure was not proportional to dose of drug. Some of the greatest falls of pressure were associated with the smallest doses of stovaine, and *vice versa*. Nor was the fall of blood-pressure proportional to the level of anesthesia.

As regards prevention or combat of the collapse, the most important factor is position of the patient. Fifteen minutes after injection the head should be lowered, and it should be kept low for at least an hour. The practice of propping the patient up on his return to bed is dangerous. One patient in this series, who had no alarming symptoms when in the operating theater, was propped up on his return to the ward. He became blanched, pulseless, and unconscious. He recovered when the head was lowered, the legs raised, and pressure put on the abdomen. Another patient, whose head and shoulders were raised on his return to the ward, died straightway.

Subcutaneous injection of strychnine appears to be without value, both as a preliminary measure to prevent collapse and subsequently in its treatment. Intramuscular injection of pituitrin proved useless in combating the fall of blood-pressure. Intravenous saline caused temporary improvement in the one case in which it was tried, but the blood-pressure fell again after one and a half hours, and the patient died. This last case was a man with a penetrating wound of the abdomen. The writer's experience of spinal anesthesia for these cases has been limited and unfortunate. Three men with penetrating wounds of the

abdomen were each given 0.07 grm. of stovaine. In each case the injection was followed by a great fall of blood-pressure, and death within a few hours.

Many cases are brought in suffering from shock. The wounds are recent, and one or more of the limbs are shattered. The face is pale, and the pulse flickering or imperceptible; there is a low surface temperature. If put to bed and surrounded with hot bottles his condition usually improves. The blood-pressure is taken every hour, and, if it is rising, operation is delayed. This delay must not be too long, or gas gangrene will supervene. The surgeon may be compelled to amputate a limb, and the anesthetist is faced with a pulseless patient who has to undergo a brief but severe operation. The lives of many of these patients may be saved if correct procedure be followed. In the first place morphia should be withheld before operation, or given only in small doses. A recently injured man is particularly susceptible to further shock, and this susceptibility is greatly increased by large doses of morphia. If chloroform be used, the patient is likely to die on the table. With ether the patient's condition actually improves during operation, but he will collapse an hour or two afterward. If the ether be given intravenously, the patient's condition improves strikingly during administration, but there is profound collapse, which is often fatal within the next two hours. The cause of death is not edema of the lungs. In several cases there was edema of the liver, and in one patient who died an hour and a half after intravenous ether the gut was edematous from stomach to rectum.

Incomparably good results are obtained with gas and oxygen, and no other anesthetic should be used for this type of case. Anesthesia may be so light that the patient will move when nerves are resected. There is practically no evidence of shock from the operation, even when this is an amputation through the upper part of the thigh. In few of these cases has the blood-pressure

fallen 15 mm., or the pulse-rate risen more than ten beats per minute. The patient is fully conscious five minutes after operation, and can literally "sit up and take nourishment." There is no collapse during the next few hours, and the subsequent progress is notably good.

Early sepsis usually takes the form of gas gangrene. In a typical case the patient vomits repeatedly, his face is of a pale muddy color, his pulse feeble and running. In spite of this apparently desperate condition, such a patient is a much more favorable subject for anesthesia than one who is suffering from shock.

Intrathecal stovaine, which causes collapse in the recently wounded man, has no such effect on this same man some days later, although sepsis may have rendered his general condition much more serious. This same distinction is seen with ether anesthesia, whether the ether be given intravenously or by inhalation. The collapse which occurs after operation on a man who is suffering from shock or recent hemorrhage is not seen in these later and septic cases. Some of the most brilliant results have been obtained with intravenous ether; the improvement in the patient's condition, which occurs during administration, is maintained afterwards, and vomiting seldom recurs.

Gas and oxygen also give excellent results. Chloroform is to be avoided: if this drug be used the man's blood-pressure will fall after operation, and he is likely to die within the next twelve hours.

There is now general agreement that chloroform is a bad anesthetic for head cases. Operation may be performed under local anesthesia; all tissues of the scalp are infiltrated in a circle widely surrounding the site of incision, with a .02-per-cent solution of novocaine with adrenalin. No pain is felt even when bone or dura is dealt with. On the other hand, the forcible cutting of bone is disturbing to the patient, so that where mentality is unimpaired general anesthesia is preferable. Warm ether vapor is exceedingly satisfactory. The

vapor is given by means of a catheter passed down the more patent of the two nostrils; thus the mask is dispensed with and the surgeon has a clear field. The ether is vaporized by passing oxygen through it. Breathing is easy and noiseless and there is no congestion, whatever the position of the patient's head, so that hemorrhage is not unduly provoked.

Men with abdominal wounds are particularly liable to develop bronchitis, perhaps owing to the deficient movement of the lower part of the chest. With open ether 54 per cent of abdominal cases had bronchitis after operation. With warm ether vapor the percentage dropped to 14.7. These figures were obtained from two comparable series occurring in the same months of two successive years; only those cases were counted which survived operation more than forty-eight hours.

Exposure of gut outside the abdominal cavity produces a more serious effect on the patient. If more than 2 or 3 feet of gut are so exposed, after a few minutes the blood-pressure commences to fall rapidly and it continues falling until the gut is returned to the abdomen. This effect is seen when the stomach and omentum are exposed, and even with the great omentum alone. The covering of exposed viscera with pads soaked with hot saline does not prevent this effect on the patient's condition. Nevertheless it seems probable that the cause is heat-loss from exposed blood-vessels.

Surgeons should be urged to make large incisions and work as much as possible with the gut lying inside the peritoneal cavity.

Apart from copious hemorrhage there is one other procedure which causes rapid fall of blood-pressure during abdominal operations. This is turning the patient on his side. The effect is produced only if the patient has been under the anesthetic for a considerable time before being turned. At the end of an abdominal operation the patient may be in good condition; he is then turned on the right or left side, in order that the surgeon may expose a wound

in the back. In a few minutes there is a great fall of blood-pressure and the radial pulse disappears. It may be hours before the patient recovers this lost ground. The indication is that wounds of the back should be dealt with before laparotomy, as turning the patient has no ill effect during the first half-hour of an ether anesthesia.

There is one type of abdominal case for which chloroform has advantages—this is the man who has a penetrating wound of the chest as well as of the abdomen. Here ether cannot be used, as it will, in the majority of cases, provoke fatal intra-thoracic hemorrhage. To these patients the writer now gives hyoscine 1/100 grain, atropine 1/100 grain, and morphia 1/6 grain, forty minutes before operation. This is followed by a minimal amount of warm chloroform vapor with oxygen. With this sequence the recovery rate has greatly improved in the chest-abdomen cases, while in the men who died there was no evidence of fresh bleeding into the chest.

With regard to fluids, it has been the author's practice to give three pints of normal saline subcutaneously during operation. For the collapsed cases this seems to be useless; they do not absorb the fluid. Autopsies on men who have died as late as thirty hours after operation have shown the bulk of the fluid to be still in the subcutaneous tissues near the site of injection. To these collapsed patients he gives saline intravenously, toward the end of operation. Only a very temporary effect is produced on the blood-pressure if transfusion is completed in the early stages of operation.

THE ANTISEPTIC PROPERTIES OF ACRIFLAVINE AND PROFLAVINE AND BRILLIANT GREEN.

GULBRANSEN and THORNTON (*British Medical Journal*, July 21, 1917) present a report to the Medical Research Committee embracing results of an intensive study of these substances. They summarize their findings as follows:

Flavine compounds and brilliant green are antiseptics which exert a slowly progressive bactericidal action. Concentrations of these substances, which at first inhibit and finally kill bacteria, are without harmful effect on phagocytosis or on the tissues locally or generally; hence they are especially suited for therapeutic purposes in infected wounds. Flavine compounds may be applied to the peritoneum with safety.

Flavine compounds (acriflavine and proflavine) are enhanced in their bactericidal potency by the presence of serum; brilliant green, in common with most other antiseptics, is reduced in its activity by serum.

The most suitable method of application of an antiseptic for therapeutic purposes must depend very greatly on its behavior in the presence of serum. When the antiseptic is inactivated by serum, frequent renewal of the watery solution is indicated, as in Carrel's procedure; this, of course, is only permissible provided that the substance is not in itself toxic.

Brilliant green satisfies the requirements for application by repeated irrigation, as a powerfully bactericidal solution (1:200) in water is practically innocuous to the tissues. On the other hand, since flavine compounds are most bactericidal in serum, the indication is to arrange the wound dressing so that these antiseptics may act in a serum medium; also, since these bodies are not rapidly thrown out of action by serum, accumulative deposit should be prevented by avoiding too frequent additions of considerable quantities of the antiseptic solution. Clinical experiences have substantiated these conclusions, and the evidence at disposal points to the application of flavine bodies by means of gauze packing or some appropriate modification of this procedure as likely to yield the best results. Thus there is evidence that, by taking full advantage of the properties of flavine bodies, a relatively simple technique may be followed.

The application of the flavine compounds, especially for the purpose of preventing the

onset of septic manifestations, in early wounds is emphasized; also their use for preventing exacerbations after operating in areas already infected.

Operative measures are an essential preliminary to the effective use of therapeutic antiseptics in wounds, since the antiseptic can act only when brought into intimate contact with the infected tissues.

OBSERVATIONS ON GAS BACILLUS IN FRANCE.

JUDD (*Surgery, Gynecology and Obstetrics*, August, 1917) after alluding to the mud and dust of the trenches and the circumstance that the clothing is always heavily infected, noted that the rifle ball fired from a distance and entering the tissues by its point creates usually an aseptic wound. That pieces of shell invariably caused infected wounds, the latter as a rule carrying in portions of garments. Moreover, the wound of entrance may be very small. The perfringens is the usual gas-forming bacillus, associated with other organisms both anaerobic and aerobic. The vitality, virulence, and power of penetration of the anaerobes is remarkable. No matter what antiseptic is used the anaerobe will be found as long as there is dead tissue in the wound. Streptococcus is found in nearly all infected wounds at some period of their evolution. It is generally recognized as an enterococcus, a regular inhabitant of the intestinal tract. Staphylococcus is also fairly frequent, as is the bacillus proteus and bacillus pyocyaneus in the later stages of wound.

A description of the phenomena of war wounds by Policard and Philip is usually accepted as correct:

Up to the fifth hour after the receipt of the wound no reaction manifests itself. Microscopic examination shows the presence of blood-clots enclosing fibers of cloth, debris of the surrounding tissues, connective tissue fibers torn, nuclei more or less altered, muscular fibers traumatized but no infiltration of leucocytes.

From the fifth to the ninth hour commences the reaction of the tissues. Migrating elements appear, the polynuclear neutrophiles, large mononuclear and small lymphocytes. This reaction of healthy tissues shows signs of degeneration.

From the ninth to the twelfth hour, approximately, the appearance of bacteria is noted: large club-shaped organisms, Gram-positive, classified as bacillus perfringens or bacillus aerogenes capsulatus. These bacilli commence to appear in the immediate neighborhood of the cloth fibers and grow in the blood coagula which enclose them.

After about the twelfth hour three phenomena dependent one on the other are evolved simultaneously: The bacilli multiply and spread out farther from the cloth fibers. There is a production of polynuclear neutrophiles, of which a small number perform the function of phagocytes; the reaction of defense of the tissues is clearly insufficient. The leucocytes are altered and are transformed by degeneration into globules of pus, but as the production of leucocytes is limited the pus is not abundant.

These phenomena continue slowly at first, but are accelerated from the twentieth to the thirty-sixth hour, at which time the pus is fetid. Almost always at the forty-eighth hour the anaerobes are associated with aerobic organisms which favor their development by absorbing the oxygen of the media in which they are growing.

In general gas infection is an early symptom. It may appear in the first few hours after the receipt of injury and usually is seen in the first few days. Chalier has illustrated by a diagram the date of appearance of gas infection in his cases. The late appearance of gas infection should be noted. This may be produced by the ligation of a vessel for secondary hemorrhage, the diminution of the blood supply allowing a flare-up of the infection. It may follow a reamputation or show itself in other cases difficult to explain.

Wounds of the thighs and buttocks are most apt to be soiled by mud and dejecta, and are consequently more apt to become

infected. Tuffier has stated that he has not noted a case of gas gangrene of wounds of the scalp, skull, or brain, of the face, jaws, or neck, and exceptionally has he observed it in wounds of the thorax. Brodier, however, has reported a fatal case of gas gangrene of the scalp.

After a period varying from twelve hours to several days, the manifestations of a specific infection show themselves by pain, swelling, and tension of the wound, changes in the pulse and the mental condition. The subjective symptom of pain is most important and may be considered as a signal symptom. When a wounded man who has had his wound dressed and has been made comfortable complains that the dressing is too tight, it is well to take down the dressing and examine the wound. Palpation of the tissues shows increased tension and sometimes gas crepitation, but this is not usually felt at an early stage. The swelling is limited to the region of the wound or to the entire limb, and is caused by the edema and later by gas, and manifests itself as an edematous or gaseous form according to the preponderance of one over the other. Rapidity of the pulse with or without irregularity is apt to be an early symptom. Changes in the mental state show themselves by a dulled, resigned, somewhat apathetic condition which may be noted in the early stages.

The wound discharges a thin, brownish pus, and pressure may expel some gas. Discoloration of the skin shows itself in various hues varying from a porcelain appearance to black. These modifications of color show themselves around the wound or in irregular patches along the limb, the vesicles appearing suddenly, but are often not present.

The presence of gas varies in intensity and is shown by percussion giving a tympanitic note, and palpation reveals no crepitation. A razor moved over the skin gives a special tone, noted by J. Quenu. The gas spreads rapidly up and down, following the vascular tracts to the axilla or groin, where it may form air-pockets. In

some cases it is arrested at Poupart's ligament. The extension is rapid at times, in two or three hours signs of putrefaction being seen.

The odor, a late symptom, is the ammoniacal or fetid one of decaying flesh.

The pulse is a symptom of great importance, and its character and rapidity are good indications of the condition and gravity of the case. The face has a leaden or subicteric hue, sometimes icteric. The mental condition is one of torpor, which varies with periods of agitation. The mind may be remarkably clear and tranquil at the end, and a soldier has even been known to ask for and smoke a cigarette an hour before death.

There is a mild or superficial form, and a severe or deep form.

Under the mild forms are recognized the cutaneous and subcutaneous varieties. The cutaneous form, not dangerous, shows itself as an edematous zone around the wound with crepitation present and sometimes bronzing of the skin. Improvement is to be expected in a few days. A second superficial form called "malignant white erysipelas" has been described. This form is characterized by a white porcelain-like appearance of the skin, slight formation of gas, and marked edema. The subcutaneous form is the "gaseous phlegmon or cellulitis." In this variety the infection is limited to the subcutaneous tissue and manifests itself by a zone of crepitation limited to the cellular tissue and shows no tendency to infiltrate the deeper parts.

The severe or deep cases are characterized by edema, and extensive gas formation spreading from a deep origin of muscular infection. Severe general symptoms develop, the limb goes on to gangrene, and the patient to death unless intervention is successful.

According to the predominance of symptoms among the severe cases have been distinguished "gas septicemia" caused by the vibron septique of Pasteur and "malignant gaseous edema" dependent on a special anaerobe of Sacquepee. The first form is

characterized by extensive gas infiltration, diffuse muscle gangrene, moderate and limited edema. In the latter form the edema predominates, the area of muscular gangrene is circumscribed, and the gas is less evident. The early diagnosis is of the utmost importance, as a few hours' hesitation is often fatal. The early discharge of thin, brownish fluid from the wound should be noted, and, in case of doubt, an incision should always be made. When crepitation is present the diagnosis is easy and can only be confused with a few conditions.

A superficial infection or a deep infection receiving proper treatment in reasonable time yields good hopes of recovery. The mortality is high in the deep forms, and one can more often predict a fatal result in severe forms than a recovery. The edematous forms have a worse prognosis than the gas forms. The so-called "white erysipelas" has a bad prognosis: almost certain death without amputation, 25 per cent recovery with amputation. Diffuse forms or cases in which the spots multiply rapidly offer little hope. Dyspnea, icterus, and small, rapid pulse are bad symptoms. Mortality records would probably vary from 10 to 50 per cent.

It is noticeable that many more cases of gas infection are seen after heavy attacks when the wounded are transported in large numbers. This may be explained by the relatively longer period of time spent on the battle-field after being wounded than in times of comparative inactivity. Also the vast numbers of wounded overcrowd the service and individuals do not receive the attention that they do at other times. It has not been infrequent at these times of great activity for masked cases of infection to develop on the trains, and for these patients to arrive at their destination in a moribund condition.

As to treatment, it is noted that before an attack soldiers are instructed to put on clean undergarments as far as possible. The first-aid packet and iodine ampules have proved a failure as far as preventing infections in shell wounds. The dressing

is too small for many of the wounds and the amount of iodine entirely inadequate. Also the fragment of shell and piece of cloth are carried into the wound and infect it and remain there beyond reach of these measures. For rifle wounds the first-aid packet is undoubtedly useful.

Preventive vaccinothrapy has been attempted, but the results thus far have not been sufficient to establish confidence in this measure. Wright has prepared an antigangrenous vaccine to be used in mixed infections. Weinberg and Seguin have prepared an auto-pyo-vaccine. These measures to be at all successful must be practiced as early as possible after receipt of the wound.

A certain number of cases of this infection are inevitable, especially when the number of wounded is very large. Early intervention in the first twelve hours is of the utmost importance in preventing manifestations. This intervention should be guided in its extent by the *x*-ray. It should consist in the excision of all damaged tissue and accurate hemostasis. In addition the wound should be disinfected. Best results have been obtained by the use of Dakin's solution according to Carrel's method. Isolation of gas gangrene cases is desirable. When the condition is definitely established the French pour ether into the wound and lightly pack with gauze, which is moistened with ether several times a day and covered with some impermeable material. Quenu recommends hot air at 800° for bad cases and claims good results. Willems gives air, sunlight, and free incisions and constant continuous irrigations of 3- to 10-per-cent salt solution. The most constantly good results have been obtained by Carrel's method and the use of Dakin's solution.

Kenneth Taylor has recommended the use of quinine hydrochloride for gas infection cases, either in the form of wet dressings or as a continuous drip. For the former a one-per-cent solution is used, and for the continuous irrigation one-tenth of one-per-cent solution, made up with saline solution or plain water. Injection of

hydrogen dioxide has been abandoned. The large number of antiseptics used proves the inefficiency of any of them. To have success amputation must be decided on while there is a chance of getting good results. The best stimulant is said to be hot saline solution given by hypodermoclysis. Gas and oxygen is the anesthetic of choice. It is the present custom to divide all the tissues at the same level, leaving the wound wide open.

GLUE FOR APPLYING EXTENSION IN FRACTURES.

The *British Medical Journal* of July 14, 1917, publishes in response to many inquiries SINCLAIR'S formula for the making of a glue and for its application to the extension required in compound fractures of the lower limb. The formula in general use is as follows:

Ordinary glue, 50 parts.
Water, 50 parts.
Glycerin, 2 parts.
Calcium chloride, 2 parts.
Thymol, 1 part.

The glycerin and calcium chloride are both deliquescent and take up the perspiration, which keeps the glue from getting brittle, and, more important still, allows perspiration to take place. This prevents the skin from getting sodden, in which condition bacteria may flourish and give rise to skin troubles. The thymol is added to prevent putrefaction and diminish smell. Every time the adhesive is heated the odor gets less and less. Experiments have proved that bacteria do not grow on this preparation. Air-tight tins which hold about a pound are filled and sterilized at 100° and placed in store. When required the contents are melted in a water-bath, and set aside a few minutes to cool.

The adhesive is applied with the palm of the hand or a brush. The skin is washed with soap and sodium carbonate solution (four drachms to the pint) in order to remove fat, and when dry the adhesive is applied without shaving the part. The area is covered evenly, and the ordinary

four-ply gauze as it comes out of the packet applied, having roughly measured the requirements and gathered it in at the level of the wrist or ankle. An alternative method is to put on a length of "elastic cotton net bandage" (S. Maw) from knee to ankle, to glue it on the outside, and then to apply the gauze as above and bandage carefully with a thin bandage.

The gauze, being spread out fan-shaped, adapts itself to the conformity of the limb, and is kept in apposition with the skin by a loose woven bandage. The extension can be made almost immediately.

The above method of extension is a very great saving of time, and when compared with the cost of good strapping is as sixpence to three shillings a limb. The following slight modification in the formula gives an excellent adhesive which is a little more elastic:

Isinglass, 50 parts.
Glue, 50 parts.
Water, 50 parts.
Calcium chloride, 2 parts.
Tannic acid, 12 parts.
Thymol, 1 part.
Glycerin, 2 parts.

SHOCK.

MCDONAGH (*Practitioner*, July, 1917) regards shock as a condition which may be due to trauma, narcosis, hemorrhage, or an intravenous injection of colloid. Recently shock has received another name, nitritoid crisis. The word anaphylaxie was used by a French physician, Richet, who found that, from the tentacles of the sea-anemone, a toxin could be prepared which caused intense vascular congestion in the viscera of dogs, leading to death after some hours. He found too that if the dose given was too small to kill the animal, a second dose of only one-twentieth the amount of the first produced serious symptoms which resulted in death. It was necessary, however, that a certain minimum number of days, eight to twelve, should elapse between the two injections. When the second injection was given three or four days after the

first, severe symptoms did not follow. Von Pirquet called certain analogous phenomena allergy. This condition is often termed by the English hypersensitiveness. It was at first thought that only proteins would produce shock, but symptoms exactly like those caused by even a non-toxic protein, such as egg-albumen, can be brought about by the intravenous administration of aluminum hydroxide to rabbits, and of salvarsan to man.

The one necessary characteristic of the substance which is to produce what is commonly called anaphylactic shock is that it shall be a colloid. Here then is the first indication of the connection between shock and immunity. Substances to produce shock must be in a colloid state, and so must antigens, antibodies, etc. Symptoms vary with different animals according to the particular organ which is most affected, but however symptoms may differ the *modus operandi* is the same in every case.

Another point about the shock-producing substance is, that it may be specific. The specificity is not absolute.

Aluminum hydroxide as a suspension colloid, and only as such, produces shock, and acts as an amboceptor in a hemolytic system. With glycerin, gelatin, or albumen, it is an emulsion colloid; consequently, as an emulsion colloid, it is not precipitated, and the electrolytes of the lipid-protein particles are not disturbed. As a suspensoid, aluminum hydroxide is readily precipitated even by univalent ions, such as those of sodium chloride; in which case the balance between the absorbed and non-absorbed electrolytes of the lipid-globulin particles will be changed. This results in an upsetting of the balance between the hydrogen ion and hydroxyl ion concentration of the serum; consequently the patient dies. A disturbance of the normal hydrogen ion concentration of the external phase quickly leads to an upset of the oxidase-reducase system of the internal phase. Calcium chloride increases the stability of the permeability of the lipid-globulin particles; wherefore, if aluminum hydroxide is in-

jected later as a suspensoid, electrolytic dissociation of the ions of the lipid globulin particles does not occur.

The shock-action of aluminum hydroxide is due, primarily, to its strong positive electric charge. So far as inorganic colloids are concerned, specificity takes no part. Specificity depends upon the amino-groups, therefore it will be seen that the shock produced by proteins is due to the amino-groups, because if these groups are in any way destroyed shock will not result.

For protein to produce shock it must not be fresh, but must have been deprived of some of its electrolytes; hence, when it is injected, provided its amino-groups have the same stereo-chemical molecular configuration as those in the lipid-globulin particles of the serum, absorption will occur.

The rapidity with which the animal dies clearly shows that shock is not due to an enzyme producing protein digestion. Anaphylactic shock occurs from the intravenous injection of any colloid, and it may occur after salvarsan and its substitution products. It occurs more often in the early than in the late stages of syphilis, more frequently after the fourth and the subsequent injections than after the first three, if the interval between the injections is more than ten days and if the patient has had a meal just before injection. A few minutes after the injection a patient may become faint, vomit, and then lapse into unconsciousness, with a failing heart, which may ultimately cease to beat; or he may become deeply cyanosed, with swollen lips and tongue and a true picture of asphyxia, due to a tetanic contraction of the smooth muscle fibers of the small bronchi; when the tetanic contraction ceases the patient regains consciousness. In the first case, as soon as the patient regains consciousness he begins to complain of excruciating pains in the legs and feet, but gets well in a short time. Some cases are followed by typical arsenical dermatitis.

Shock may occur in any individual and is more likely to be noted in those perfectly

healthy than in chronic alcoholics. In most cases the kidneys are perfectly normal. Asthma may be a symptom of chronic shock. Urticaria pigmentosa is probably always indicative of this condition. In acute shock complement vanishes altogether. In chronic shock it is partly destroyed. Complement represents the balance between the hydroxyl and hydrogen ion concentration of the serum; in acute shock we know the balance is upset.

In any infection, acute or chronic, if the protective capacity of the host's cells is stimulated to its utmost point, then eosinophile cells and mast cells usually make their appearance.

These are rich in oxidases and reductases which regulate the hydrogen ion concentration. The oxidase-reductase system corresponds to the phosphate and bicarbonate systems, which maintain the constant hydrogen ion concentration of the fluid part, in which the "solid" particles are in "solution."

Friedberger and Hartoch found that acute shock could be avoided by injecting intravenously an hypertonic solution of sodium chloride. Shock can be increased by the injection of phosphates, particularly the glycerophosphates of calcium. The author states that he has had three cases of hay-fever in which salvarsan wrought a cure for the ensuing summer. Salvarsan, owing to the arsenic it contains, would tend to increase the hydrogen ion concentration. If so, it would counteract the effects produced by an increase of the hydroxyl ion concentration.

A characteristic feature of all shock conditions is vasodilatation. The primary change is an alteration of the permeability of the lipoid-globulin particles in the serum. The vasodilatation is primarily of peripheral origin, as is shown by the fact that adrenalin, a drug which acts centrally, is not so useful in shock as chloride of barium, which acts peripherally on smooth muscle fibers and causes an instantaneous rise of pressure.

The therapeutic action of a colloid is

mainly dependent upon (1) character—i.e., whether it is an emulsoid or a suspensoid; (2) atomic or molecular weight.

Colloids are usually divided into two classes: (1) emulsoid; and (2) suspensoid; the main difference between the two being dependent in part upon the presence or absence of amino-groups—that is to say, a colloid which behaves, when injected into the body as an emulsion colloid, has, in most instances, amino-groups in its molecular constitution, or absorbed to it. Emulsion colloids have a greater therapeutic action than suspension colloids, because owing to their amino-groups their surface action is greater.

The complex emulsion colloids are proteins. The proteins are more complex in fungous than in bacterial diseases, and still more so in protozoal diseases. Proteins are widely used in vaccines, and reactions from the injection of proteins may be avoided by adding serum to the bacterial emulsions, preferably a specific antiserum. This process is generally called a sensitization. Proteins will not readily produce shock *de novo*; the body must have prepared a resisting substance against each individual protein first. Consequently, shock, at first sight, appears to be specific.

As to the prevention of shock, the treatment of the case will naturally depend upon whether the patient has a pulmonary or a cardiac attack.

In a pulmonary case, atropine must be injected; giving oxygen to inhale; or the usual methods for producing artificial respiration may be tried; but as a rule they are useless. In a cardiac case the patient should immediately have his head and thorax lowered, injections of ether, camphor, and strychnine should be given, oxygen should be inhaled, and artificial respiration instituted. Heat to the heart region should be applied, and brandy should be taken by the patient if possible.

In both the cardiac and the pulmonary cases, pituitary extract or adrenalin should be used. The former is better than the latter, but neither of these drugs will be of

great service unless they are injected before the administration of the drug which caused the shock. Injecting pituitrin as a routine procedure is impracticable. The action of pituitrin and adrenalin is to cause vasoconstriction of the capillaries, and thus they prevent the vasodilatation which is an accompaniment of shock, although not the main feature. Their action is, therefore, only an indirect one. As the direct cause of shock is an upset of the normal hydrogen ion concentration, which changes the colloidal character of the protein particles, and results in the patient getting insufficient oxygen, the obvious procedure to adopt is to increase the stability of the permeability of the protein particles, and thus prevent the oxidase-reducase system from becoming deranged. Calcium chloride will do this; therefore, in every case of shock, 10.0 Cc. of a 2.5-per-cent solution of calcium chloride should be injected intravenously, and the patient's life will be saved if the injection be administered quickly enough. It is a good plan to make the solution isotonic with glucose, and to add gelatin; consequently the writer now uses 10.0 Cc. ampoules containing calcium chloride 5 per cent, glucose 15 per cent, and gelatin 3 per cent. As this mixture forms a jelly, it must be heated and diluted up to 50.0 Cc. or 100.0 Cc. before it is injected. Ampoules of 10.0 Cc. are handy, and the jelly is easily melted.

It is possible that the treatment of shock produced by drugs should differ from that produced by hemorrhage, because Hurwitz claims to have had excellent results in the latter form, by injecting a 5-per-cent solution of gum arabic in Locke's solution. Viscosity is probably a more important factor in shock produced by hemorrhage than in the form produced by drugs; even so, gelatin is preferable to gum.

Bayliss lays much stress upon the diminution of plasma in the blood taken from cases of shock. As many of the protein particles go into solution and the amount of absorbed calcium is decreased, when shock occurs obviously the plasma will be dimin-

ished and the viscosity of the blood altered. The diminution of plasma gave rise to the idea that cases of shock should be treated with an artificial serum, but it is extremely doubtful whether one could be prepared which would prove more efficacious than the calcium chloride-gelatin-glucose mixture.

In cases of acute, subacute, and chronic shock produced by one drug, the condition can be remedied immediately by giving another drug which has an opposite charge. In cases of mercurialism, plumbism, and arsenical poisoning, intramine and iodine should be prescribed, and *vice versa*.

It must not be forgotten that although shock is due to an upset of the normal ion concentration, there are several other etiological factors of a secondary nature. Some people are more liable to shock than others; fear may predispose thereto, so may a heavy meal just before injection, etc.

If a patient dies under an anesthetic, death is usually ascribed to status lymphaticus. Many of the deaths are ordinary cases of cardiac shock. The author thinks that status lymphaticus is a toxic condition which renders the patient more liable to shock. If this is the case, then the status lymphaticus is not the cause of the shock or death. It is probable that the toxin is one which raises the hydrogen ion concentration.

Nitrous oxide and ether, as shown by Crile, increase the hydrogen ion concentration of the blood—presumably chloroform has the same action; therefore, in shock following an anesthetic, it might be advisable to inject a colloid which raises the hydroxyl ion concentration, such as colloidal iodine or intramine. It is a well-known fact that shock following chloroform can be prevented by using ether first, but the explanation is probably not so well known. Lillie (quoted from Crile) demonstrated that the addition of ether to the sea-water, in which arsenicola are living, causes changes in the semipermeable membranes, as a result of which these membranes become less permeable to the passage of ions. Therefore, if ether is used before chloro-

form, the latter cannot exert its full power, with the result that shock is less likely to occur. The author mentions this because it fits in with what has already been said concerning the share permeability takes in the production of shock.

Taking, finally, the case of alcohol poisoning, alcoholics are more difficult to anesthetize than non-alcoholics, presumably for the same reason that ether checks the deleterious action of chloroform. One of the best remedies in alcoholism is colloidal iodine.

A NEW PHYSICAL SIGN IN PNEUMOTHORAX AND IN PLEURAL EFFUSION.

WILLIAMSON (*Lancet*, July 7, 1917) has observed this sign so frequently that he is likely to consider it valuable confirmatory evidence of either pneumothorax or pleural effusion. The sign consists in a markedly diminished blood-pressure in the leg as compared with that in the arm on the same side, a difference of 10 mm., and in many cases of over 20 mm.

In normal persons the systolic arterial blood-pressures taken simultaneously with due precautions in the arm and leg of the same side (the armlet around both limbs being at the same level) will be found to yield practically identical readings. In some pathological conditions differences will be found. Leonard Hill observed that constantly in cases of aortic incompetence. Anatomically the pleura on each side, more especially on the left, comes into relation with the descending thoracic aorta as it lies on the vertebral column, and the writer suggests that the most obvious cause is that when the pleural cavity is distended with liquid or with gas pressure upon the aorta this causes to a greater or less degree corresponding diminution in systolic pressure distally to the compressed area.

The methods of observation have been as follows: The patient has been at rest in bed, so that the armlet used for the leg reading and that for the arm have both been at the level of the heart. The Riva Rocci

type of instrument was used, an Oliver's armlet of a width of 12 cm. being placed round the upper arm, and another one round the calf of the same side. Both armlets were connected by means of a three-way tube with the same pump and manometer. One observer took the systolic reading in the radial artery, the other in the dorsalis pedis or posterior tibial, and for alternate observations the two observers changed about so that the one who had previously taken the arm reading now took the foot one, and *vice versa*, the object of this procedure being to eliminate any personal equation. The readings taken were those obtained on letting the air out of the armlets after inflating them to a degree greater than necessary to obliterate the pulse in both limbs. The results are recorded in mm. of mercury.

PENETRATING WOUNDS OF THE ABDOMEN.

ARMSTRONG (*Lancet*, July 21, 1917), based on Serbian experience, makes a plea for operation in all cases of intestinal perforation due to bullet wounds. Cases not having operative treatment were placed in the sitting Fowler position. Subcutaneous saline was given by Lane's apparatus, as much as six pints in twenty-four hours in some cases, together with pituitary extract and camphor in oil. Neither food nor fluid was given by mouth for the first three days. Hyoscine and morphia for restlessness. After preliminary stimulation operation was performed on all patients having intestinal lesion; by either right or left rectus or mid-line incision. Cases that recovered had no drainage tubes in the peritoneal cavity, and these should be discarded except when there is a definite localized abscess. A cigarette drain was always left down to the peritoneum. The wounds always suppurred, due to the bacillus coli. Thus a certain number of antibodies form and have a beneficial influence on the underlying general peritonitis.

Subcutaneous saline was used as an

after-treatment, the rectal method being regarded as inefficient. The author's experience is limited to ten cases. Two of them showed no intestinal perforation, and both recovered. Of ten cases with multiple perforation of the intestine of over thirty hours' duration, seven died and three recovered. Of seven cases treated more conservatively of more than thirty hours' duration, all died. One case of over thirty hours' duration, treated by the Murphy operation (quick drainage), also died. Three cases illustrating rigidity of recti due to injury of diaphragm, all recovered.

Armstrong states that hemorrhage is the most frequent cause of death in wound of the abdomen in the first hour.

Roundworm was present in two of the cases. Intermittent rigidity of the recti muscles is an important sign of an injured diaphragm. The rigidity may last for about thirty-six hours. It is not to be confounded with the rigidity of peritonitis.

HEMOLYTIC JAUNDICE.

GIFFEN (*Surgery, Gynecology and Obstetrics*, August, 1917) reports from the Mayo Clinic upon 17 patients with hemolytic jaundice. Twelve of the patients were splenectomized; five were treated medically. Of the 17 patients, seven had been jaundiced in infancy, four others since childhood, and four had an onset between the ages of eighteen and twenty-two. It is probable that in 10 of the entire series the disease should be classified as congenital in type. Three cases were definitely familial. Six others gave suggestive histories. One patient had a history of the onset of jaundice at the age of thirty-two, and another as late as forty-six years of age. The jaundice in all the cases of the series was acholuric and seems never to have completely disappeared. It was remittent rather than intermittent. In 12 of the 17 cases the spleen had been recognized as being enlarged for some time. The spleen, though large, is never enormous, as is the spleen of splenic anemia or leukemia. Two of the

five non-operative cases presented evidence of enlargement of the liver. In one of these it was marked. Eight of the twelve operative cases showed enlargement of the liver at operation, and in two of these a surgical diagnosis of cirrhosis of the liver was made. The cirrhoses were of the granular rather than the lobulated type and of slight degree. The livers were not contracted. But one patient, an operative case, showed evidence of abdominal fluid; the amount of fluid was small. The liver was much congested, but a positive diagnosis of cirrhosis could not be made.

Sixteen of the seventeen patients gave a history of attacks, some very mild in character, of abdominal distress, nausea, fever, vomiting, and headache, and when gallstones were present seizures of severe pain. Usually these crises were mild in childhood and more severe in later life. In cases of short duration they were mild and not long. The most important evidence can be obtained from the history in arriving at a differential diagnosis of hemolytic jaundice from recurrences of deepening jaundice with crises.

In but two instances was the anemia severe. In most cases it was of moderate degree and chronic type. The hemoglobin in the twelve cases varied from 24 to 86 per cent, and averaged 59 per cent. In the entire group of seventeen cases the lowest erythrocyte count was 1,340,000. The color index was, as a rule, high. This uniform color index is quite definitely indicative of the myelo-toxic factor in the disease. There was a slight tendency toward leucocytosis. After splenectomy there was a prompt increase in the hemoglobin estimation and the red-cell count. Postoperative leucocytosis is not a constant finding. Although there was a relative increase in the polymorphonuclears, the reverse has been noticed in the cases of pernicious anemia after splenectomy. The condition of the blood was reported as normal in nine of ten living patients two months to nine and a half years after operation. There was decided or constant decrease of fragility of the red

cells after splenectomy. Urobilin was present in the five cases in which the urine was tested for this substance. Bile was absent in all save one, in spite of the frequency of cholelithiasis as a complication. The diagnosis of hemolytic jaundice may at times be confused with the presence of bile in the urine, but an obstructive jaundice has been superimposed upon an acholuric jaundice.

The Wassermann test was negative in 11 of 13 patients tested. Noticeably low blood-pressure was present in all of the cases except one, the systolic frequently reading below 115. In general very little loss of weight was noticed. The incidence of gall-stones in the severe types of jaundice was high. Seven of 12 operative cases (58 per cent) showed gall-stones, for which a later operation was usually done. The attacks of acholuric crises may become more severe over a period of years, and pain is added to the early syndrome of deepening jaundice, abdominal distress, fever, malaise, and headache until the pain becomes the prominent symptom and the attacks are quite typical of cholelithiasis. The values for urobilin and urobilinogen in the duodenal contents are quite constantly high. This value is constantly decreased after splenectomy. Preoperative transfusions were not necessary in any of the cases of this series. Immediate postoperative improvement was very striking. The jaundice frequently becomes noticeably improved within twenty-four hours and may entirely disappear during the first few days. There was one operative death. The reports in all save two of the other patients were good. The disease in the two patients who have not done so well was of the acquired type. One died four months after splenectomy. The other improved rapidly and was in excellent health after 1½ years. She then had a relapse of both the anemia and jaundice, but improved satisfactorily after two transfusions and is now in good health. The remaining eight patients have been well for twenty-three months or less.

Hemolytic jaundice may be regarded as

the diagnostic keystone of the diseases associated with splenomegaly and anenia. In clinical significance it occupies the center of a group of diseases with cirrhosis of the liver, syphilis of the liver with splenomegaly, and obstructive forms of chronic jaundice, on the one hand, and pernicious anemia, splenic anemia, leukemia, and splenic Hodgkin's disease on the other. An appreciation of the characteristics of hemolytic jaundice gives a new insight into the diagnosis of these interesting diseases. The differentiation between chronic jaundice due to obstruction of larger ducts and hemolytic jaundice (which in part may be due to obstruction of smaller ducts) depends largely on a recognition of the type of jaundice present. The jaundice of uncomplicated hemolytic jaundice is an intensified "hemolytic" icterus, an exaggerated form of the icteroid tinge so constantly seen in pernicious anemia. It is an acholuric jaundice; there is no bile in the urine. It is not associated with pruritus. It is of a chronic nature and may be comparatively deep or of mild grade. It is usually remittent in type and never entirely disappears. In obstructive jaundice there is cholic urine and frequently acholic stool; in hemolytic jaundice, acholic urine and cholic stool. The second more important distinction between obstructive jaundice and hemolytic jaundice lies in the difference in the resistance of the erythrocytes in the peripheral circulation to hypotonic salt solution. In obstructive jaundice the resistance of the red cells is quite constantly increased—sometimes very markedly increased—while in hemolytic jaundice it is decreased; that is, the cells are more fragile. This has been found to be a congenital condition, and members of the family should be tested for fragile corpuscles in order to ascertain exact data concerning the congenital factor in a larger percentage of the cases. An increase of fragility in other members of the family may prove to be corroborative evidence to a diagnosis.

Certain types of cirrhosis of the liver with jaundice may prove to be impossible

of a clinical classification. While the spleen is usually smaller in cirrhosis of the liver than in hemolytic jaundice, and the resistance of the red cells is increased, both of these criteria may be vitiated; that is, the spleen may be quite large and the presence of toxic substances and bile pigments may affect the resistance of the red cells. The author has seen so confused a condition in the same patient as cirrhosis of the liver, marked splenomegaly, cholelithiasis, and a pernicious anemia type of blood picture, where only a definitely increased fragility of the red cells indicated the way to a diagnosis of hemolytic jaundice as the probable primary condition. A more baffling confusion may exist when hemolytic jaundice has progressed through its attacks of acholuric crises to typical attacks of cholelithiasis with a secondary obstructive jaundice superimposed upon the original hemolytic jaundice. In this event, the Ribierre test for an increased fragility of the erythrocytes, if positive, becomes of especial importance. Increased fragility, a history of former recurrent attacks of jaundice and crises, together with a predominating splenomegaly and a more or less severe anemia, will usually, upon careful analysis, serve to indicate the proper diagnosis.

The importance of obtaining a history of recurrent attacks of jaundice is exemplified in the mistake not uncommonly made of confusing hemolytic jaundice with simple splenic anemia. The history of every patient with suspected splenic anemia should be reviewed carefully for former attacks of jaundice and crises of the acholuric type. In this way only will patients with little or no jaundice at the time of examination be differentiated. Hemolytic jaundice is always to be considered before a diagnosis of splenic anemia is made.

Pernicious anemia may simulate hemolytic jaundice. Given a young patient with a large spleen and evidence of very active hemolysis resulting in a moderate degree of icterus, hemolytic jaundice would at once be suspected. The pernicious anemia type of

blood picture with high color index occasionally occurs in hemolytic jaundice when myelotoxic features have developed, and this finding further confuses the picture. It would appear that the chief reliance in these cases must be placed upon the absence of typical history of a pernicious anemia and the finding of fragile red cells; for in pernicious anemia there is not the increased fragility which is found in hemolytic jaundice. In many cases of pernicious anemia in which the Ribierre test has been done, the resistance of the erythrocytes to hypotonic salt solution has been constantly normal or increased.

Splenic Hodgkin's disease usually remains undiagnosed until surgical exploration or autopsy. The spleen is nodular, and this characteristic may be possible of recognition upon physical examination. A history of the former enlargement of the lymph nodes may be obtained while the lymph glands may be small and the spleen large at the time of examination. In every case of splenomegaly the condition of the lymphatic system demands observation, and if necessary a gland should be excised for pathologic diagnosis. The author has recently seen two patients with Hodgkin's disease who presented very large spleens and small lymphatic glands; in one of these a diagnosis was made upon the microscopic examination of an excised gland.

VENEREAL DISEASES AND SYPHILIS AMONG THE FRENCH AND ENGLISH.

There is a somewhat breezy letter from GRAJEWSKI (*Urologic and Cutaneous Review*, August, 1917) concerning the British General Headquarters at Rouen. They have 2000 venereal cases all the time. A general officer is quoted to the effect that he has seen over 50,000 cases of syphilis since the beginning of the war. They have had a patient who had had three infections—infected, cured; infected, cured; infected. They have had many infected twice. They believe that they can cure a great many of their cases. On account of the severe cold

all of the waterworks of the hospital are at times frozen up and they are unable to distill water for salvarsan.

They are using a neosalvarsan by Dr. C. Pepin, of Paris. Two .9 gm. ampoules dissolved in 30 Cc. of distilled water make three 10-Cc. doses of .6 gm. neosalvarsan. It dissolves very rapidly with little shaking, and they speak highly of it. Grajewski watched three captains (doctors) assisted by three corporals give 120 .6 gm. intravenous injections of neosalvarsan to 120 patients in eighty minutes by the watch.

They use a powerful 30-Cc. syringe, moderately long, heavy bore, sharp platinum needle. The patient lies on a wooden bench, his right arm lies on a bench which connects the heads of the four tables in series. The soldier's muscular, big veined, right arm is encircled by an 8-inch drainage tube tourniquet. The attendant pushes the blood from the hand up into the arm and touches the spot with iodine. The surgeon punctures his vein, draws a little blood in his syringe, corporal loosens tourniquet, patient opens hand, injection is made, corporal flaps a piece of gauze over point and with same motion lifts patient to sitting position and off of foot of bench. In the meanwhile the surgeon sticks his needle into wood alcohol, flames it, refills syringe, and is ready for the next. A corporal is continually giving new bottles of prepared neosalvarsan. The writer never saw them miss a vein on the first jab. They hold their syringe loosely in their hand, flat beveled surface of the needle upward, with their left index-finger hold skin in line of vein, two inches distal to point of injection, and the thing is done.

One corporal makes the cards, another applies a little adhesive to the gauze if the puncture bleeds. The patients are up and about; they have never had a death, and very few bad reactions. They allow two full days to elapse between each of the three injections, and eleven days to elapse between each of the four series of injections. Twelve injections to each case.

The cases also get 1 grain of a mercury preparation intramuscularly every two days.

The mercury preparation was new to the writer and he did not remember it. They average forty seconds to the injection.

This account runs largely to time, but this is war, the patients are practically prisoners, and three doctors are treating 500 to 800 men a day.

The gonorrheal problem is much more difficult. Eight hundred daily; three doctors at present, four usually. Irrigations are done by the patients. Many pails of permanganate are hung on a long iron rail. Two siphon tubes lead down to the glass nozzles. The patient lines up on each side of a long, wide trough with a central partition running its length. Each trough takes care of 200 men daily. They try to irrigate into the bladder. Relatively few complications occur. After two or three weeks, if the patient does not do well, they change to zinc sulphocarbolate, zinc chloride, eusol, silver nitrate, .20-per-cent argyrol, or ½-per-cent protargol instillations with an Ultzmann syringe for obstinate posterior urethritis. Lately they are employing succinamide of mercury as an irrigation.

On many occasions they suspect the men of attempting to retard their recovery. As soon as a complication arises irrigations are stopped, patient goes to bed, fomentations are applied for epididymitis and orchitis, hot sitz baths for prostatitis, etc. The pathologist makes his own vaccines, and they are used freely for complications. They have had no gonorrheal endocarditis, and a very small amount of gonorrheal rheumatism. High-frequency current is used in the subacute stages of rheumatism with satisfactory results.

Many cases hang on, suffer frequent relapses, and the doctors are not encouraged by their results. They have cured cases in twenty-one days, but as a rule feel that their results are little better than they had in private practice before the war.

Prophylaxis: It seems as if there is no well-organized method of instructing the troops about or providing them with prophylactic measures.

The men being kept in detention camp

until they pass three examinations, at intervals of five days each, in order to see if they are free of discharge, and then being kept without leave for one year, should protect England and the colonies.

Syphilitics must show a continuous negative Wassermann before discharge. The author thought they were doing poor work in regard to prophylaxis, but excellent work in regard to the cure.

REVIEWS.

THERAPEUTICS, MATERIA MEDICA AND PHARMACY.
By Samuel O. L. Potter, A.M., M.D. 13th Edition, Revised and Enlarged, by Elmer H. Funk, M.D. P. Blakiston's Son & Co., Philadelphia, 1917. Price \$6.00.

Potter's *Materia Medica and Therapeutics* needed revision because during recent years, while something had been added to it, little that could well be taken out had been removed from its pages. The choice of the publishers in choosing Dr. Funk as the editor of the new edition was a wise one, as he brings enthusiasm and clinical experience to the difficult task of revising a text which has been prepared by some one else. In order to make his work more competent he has called to his aid a number of his colleagues in the revision of different portions of the book, and he has introduced, of course, the nomenclature, and the other necessary facts for a book on therapeutics and pharmacy, from the Ninth Revision of the U. S. Pharmacopœia.

Those of our readers who are familiar with the earlier editions of this book will remember that after the preliminary material, which is appropriate to such a volume, the author takes up drugs according to their alphabetical arrangement, briefly discussing their physiological action and their therapeutic applications, and then proceeds to an alphabetical arrangement of diseases in which brief notes as to the employment of various drugs and non-medicinal measures are given, usually in a line or two. Introduced in this portion of the book, which is very considerable, there is an alphabetical arrangement of the common poisons and the method of treating their effects.

The closing pages are taken up with an appendix giving a list of contractions and Latin phrases used in writing prescriptions

with the corresponding English equivalents, hypodermic formulæ, and some tables of differential diagnosis of the more common diseases.

The very last pages are taken up with tables showing various weights and measures and the law and regulations relating to the production, importation, manufacture, etc., of narcotic drugs as prescribed under the so-called Harrison Act.

The practitioner will be able to get a good many hints from the contents of this volume which will prove useful to him in practice, and so may the student of medicine.

Familiar as we are with the earlier editions of this book, we have looked with interest for the additions and corrections which the editor has made. They are wise and appropriate. We wish that he had gone a step further and revised more thoroughly some of the statements in the original text, which we believe should be modified if they are really to represent modern therapeutic beliefs. For example, we doubt whether the statement is true that "quinine reduces the size of the spleen when enlarged, and lowers the temperature of pyrexia by lessening oxidation." While these statements may be true in a sense, it scarcely gives the student a correct conception of the action of this drug along these lines. So, too, we do not believe that the editor is responsible for the statement that ethyl chloride is increasing in popularity as a general anesthetic, as we believe its greatest popularity existed some years ago.

Without doubt, the book, having been revised so thoroughly, will once more renew its popularity, and we believe that when Dr. Funk revises the next edition he will be

still more thorough in striking out some statements and supplanting them with others so that we will have the advantage of his opinions, rather than those of the author, who has now been dead for some time, and some of whose early views still persist in the text.

As intimated at the beginning of this review, there is probably no task more difficult than the revision of a text-book written by some one else. There is natural hesitancy on the part of the reviser to deal disrespectfully with the opinions of the author, and oftentimes it is most difficult to determine whether facts are of sufficient importance to justify their retention or whether they should be more or less brutally excluded. In the face of these difficulties Dr. Funk has cleverly completed his task and greatly improved a book which has always possessed value.

SANITATION FOR MEDICAL OFFICERS. By Edward B. Vedder, M.D. Medical War Manual No. 1. Illustrated. Lea & Febiger, Philadelphia, 1917.

This is the first of a series of medical war manuals authorized by the Secretary of War, and under the supervision of the Surgeon-General of the Army and the Council of National Defense. Dr. Vedder is a Lieutenant-Colonel in the Medical Corps of the U. S. Army, and is already favorably known for contributions which he has made in fields closely connected with the service.

The series is printed on very thin paper, which, nevertheless, is tough enough to stand hard usage, and appears in such shape that it can be readily carried in the breast pocket of the khaki uniform, being about three-eighths of an inch thick, although the book contains 206 pages of text and a considerable number of blank pages upon which the medical officer may make such notes as he deems wise.

In the present issue, which is not supposed to contain anything novel, but a brief summarization of what reserve medical officers should know, there are five chapters, the first dealing with sanitation of the

camp; the second, sanitation of the march; the third with sanitation of the trenches and battlefield; the fourth with insects concerned in the transmission of disease; the fifth, notes on transmissible diseases. In the last two chapters a large amount of information is given which might readily be included in a small book on the practice of medicine in that the etiology, period of incubation, prophylaxis, and diagnosis of transmissible diseases is discussed.

We shall look forward to the appearance of subsequent volumes in this series with a good deal of interest. They will undoubtedly provide reserve officers with much valuable information.

THE PRESCRIPTION. Therapeutically, Pharmaceutically, Grammatically, and Historically Considered. By Otto A. Wall, PhG., M.D. 4th Revised Edition. The C. V. Mosby Co., St. Louis, 1917.

The author devotes 268 pages to the consideration of the prescription along the lines indicated in the title just given. As Professor of Materia Medica, Pharmacognosy, and Botany in the St. Louis College of Pharmacy he is familiar with the mistakes and errors into which the dispensing physician often falls, and his design in the compilation of his text has been to meet the needs of the pharmacist in deciphering and compounding prescriptions and the necessities of the physician in writing them.

An interesting part of the volume is that which is devoted to the history of the prescription from the earliest times and including the survival of early superstitious practices.

FOOD FOR THE SICK. A Manual for Physician and Patient. By Solomon Strouse, M.D., and Maude A. Perry, A.B. W. B. Saunders Company, Philadelphia, 1917. Price \$1.50.

This is a very useful little manual designed for the use of physicians and nurses in the dietetic management of their cases. After a brief preliminary chapter upon food and its uses, including the standard tables as to the relative proportion of protein, fat, carbohydrate, etc., in various foodstuffs, with interesting statements as

to the number of calories needed by human beings at various ages, it proceeds to a description of menus for normal individuals, and then takes up the dietetic management of diabetes mellitus, giving details in regard to the so-called Allen method of treatment. Possibly one of the best things in the book, from the standpoint of the physician, is the table on page 49 which gives the percentages of carbohydrate in various commonly employed foodstuffs. Quotations are also made from Joslin as to the means by which we should test the ability of the patient to utilize starches without the elimination of sugar, and also his ability to utilize proteins and fats. A very large part of the book is devoted to this important subject of diet in diabetes. This is followed by a chapter upon diet in

gout, and other pages devoted to diet in diseases of the kidneys, in diseases of the stomach, and in diseases or disorders of the intestines and liver. The closing pages of the book are devoted to food in pulmonary conditions, including tuberculosis, and in diseases of the skin, with a consideration of feeding in fevers. Last of all, various diets which have been recommended by numerous authorities in the treatment of obesity are given.

From time to time within the last year or two we have had occasion to call attention to books dealing with dietetics. Several of them have been designed to go into the matter most exhaustively and scientifically. This one is essentially practical, and the physician can obtain from it definite information with ease.

NOTES AND QUERIES.

CURRENT EPIDEMICS IN THE CENTRAL EMPIRES.

The *Lancet* of September 22, 1917, points out that medical science during the present war has succeeded in preventing the occurrence among the military of certain epidemic diseases which in former campaigns have ravaged the forces in the field. But among the civil population of the Central Empires and among the unfortunate inhabitants of the occupied territories it is otherwise. At the present time smallpox, typhus, and dysentery are very prevalent, and relapsing fever is threatening to add itself to the list. For more than two years smallpox has been epidemic in Austria, and more particularly in the provinces of Galicia and Bukowina. Not far short of 50,000 smallpox cases have been reported in Austria during 1915-16, more than 42,000 of the attacks occurring in these two provinces, whence the infection was carried to some of the larger cities, including Vienna, Prague, and Budapest. In Vienna during the twelve months immediately following the outbreak of war over 1600 cases were

reported. As vaccination is not obligatory in the civil population of Austria many persons are unprotected against smallpox infection. In Poland the disease is visiting Warsaw, among other places.

Germany is regarded as being the best prepared of all European countries to resist attack by smallpox; but the disease has been epidemic in North Germany during the first seven months of 1917, 2400 cases having been notified to the authorities, the largest number yet recorded in Germany since notification was begun. The prevalence being in December, 1916, at Hamburg, where Russian prisoners were being employed as dock laborers and by whom probably the infection was introduced. In addition to the prisoners of war large numbers of the people of the occupied districts of Belgium, Northern France, Poland, and other Russian provinces have been deported from their homes and compelled to work in North Germany in the fields or in the mines and factories or in other industries. These wretched slaves, coming from countries in which vaccination is not compulsory, are in many instances unprotected

against smallpox, and form susceptible material on which an epidemic could easily develop. Their susceptibility to infection is not likely to have been diminished by the overcrowding, underfeeding, and the overworking to which they have been subjected, nor by the depression of spirits from which they have suffered during their bondage. From Hamburg smallpox spread in the early months of 1917 to other districts in North Germany, affecting also some of the large towns, including Berlin, Munich, Leipzig, Potsdam, Essen, Bremen, Altona, Kiel, and Lübeck. Smallpox is in Europe generally a disease of the winter and spring months, so that while there has been in August some diminution in the number of cases reported weekly, it is very probable that with the advent of winter we may see a recrudescence of the epidemic in Germany.

Typhus is endemic in the Austrian province of Galicia, but since the outbreak of war it is probable that typhus infection has been brought into the Austrian war zones by prisoners from Russia and Serbia. It is well known that the wretched Serbian prisoners interned in Austria since the war have died in thousands from typhus in the concentration camps. Among the Austrian civilian population more than 13,000 typhus cases occurred during 1915, and over 12,000 in 1916. During the first three months of 1917 about 3000 fresh cases were notified, most of them in Galicia. In Hungary, typhus is now prevalent, and in the first half of 1917 some 2500 cases were reported. In Bosnia and Herzegovina typhus has also been rife during the whole period of the war. In Poland, now occupied by German troops, there is at the present time a very severe epidemic of typhus going on, especially in the city of Warsaw and in the adjoining districts. During the last twelve months nearly 16,000 cases have been reported, of which more than 8500 occurred in Warsaw. Typhus has been appearing in Germany since 1914, chiefly among the prisoners of war who, crowded together in large numbers in

camp, with little means afforded them of maintaining personal cleanliness or opportunities for changing their clothes and keeping themselves free from body vermin, soon develop typhus of a virulent kind, probably infected in the first instance by Russians.

Dysentery is epidemic in Germany, and especially in Prussia, where in the first seven months of 1917 about 13,000 cases were notified among the civil population, more than 6000 attacks being reported during the last fortnight. The chief places at present affected are Berlin, Potsdam, Strasbourg, Frankfurt, Munich, Mannheim, and the industrial districts of Rhenish Westphalia. In Austria, too, dysentery is epidemic, and from February to July, 1917, more than 4000 cases were officially recorded. A Vienna newspaper recently stated that "cholera itself could not be worse than the dysentery epidemic now raging." This paper also asserted that the disease had been brought to Vienna by soldiers from the front. There is suggestion that these prevalences of dysentery in Germany and Austria are associated with malnutrition, arising partly from improper or insufficient diet and the use of the so-called "food substitutes." There is a great scarcity of milk, and dysenteric patients are often unable to obtain this essential article of their diet. When obtainable the fatty matter has already been abstracted from the milk by order of the government for use in munition works. There appears to be a possibility that before long relapsing, or famine, fever will be added to the epidemic diseases current in the Central Empires. Already cases are being reported weekly in some districts of Germany, and Mannheim is especially mentioned as one of the worse sufferers. In Poland relapsing fever is also occurring, and cases in increasing numbers are being reported week by week, especially in the towns of Warsaw, Lodz, and Plock, where the Poles are experiencing great privations and where the various epidemics have been adversely affected by the absence of medical men.

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ORIGINAL COMMUNICATIONS.

"PURGATION MEANS PERFORATION."¹

BY THADDEUS E. WILKERSON, B.S., M.D., RALPHIGH, N. C.

Fifty-two cases of ruptured appendices during the year 1916, in the service of Dr. H. A. Royster, invites the writing of this paper.

For the past ten years the pendulum has swung in the direction of surgical treatment for the relief of acute appendicitis, until at the present time the consensus of opinion is that procrastination should be abolished and that surgical aid should be obtained as early as possible. Granting this to be true, there still exists a space of time between the onset of the attack and the operating table which often decides the postoperative result. For it is during this period that the family physician too frequently converts a simple acute appendix into an appendix that is perforated, giving rise to peritonitis and its sequelæ.

The seriousness of acute appendicitis is always increased or decreased in proportion to the line of treatment during these first few hours or days of the attack. It is here in the early stage of the disease that the family doctor has the first opportunity to determine what the results will be in the end, and he either handles the case safely by bringing into play his "masterly inactivity" or he feels that he is called upon to assist nature by giving full doses of purgatives. To him the symptoms of general abdominal pain, at times excruciating, associated with nausea and vomiting, some rigidity of the abdominal muscles, slight acceleration of the pulse with 100° to 101°

temperature, either means that he must help nature eliminate a package of peanuts which the patient has recently eaten by administering full doses of every known purgative from postpartum pills to Pluto water, or he places the proper interpretation on these symptoms and reads them as danger-signals, warning him to keep his hands off. When he chooses his weapons according to the first course of procedure, he antagonizes nature by putting the decreasing peristalsis of the gastrointestinal tract on the run, often aiding the effects of his purgatives with food and drink. Then it is that the appendix which is quiet, swollen and inflamed is attacked with formidable line plunges of peristaltic waves, causing nature to cease its work and to watch wave after wave attack its breastworks, until finally it can stand no more and nature's fortifications are blown to pieces by her own supposed-to-be assistant.

There is another phase of this subject which brings in those outside the profession, namely, the laity. In about one-fourth of the cases the purgatives have already been given before the doctor is sent for. As an explanation of this they will tell you: "The first thing our doctor does is to thoroughly clean out the bowels, so we thought we would do this and then call him later, if necessary." To avoid this in the future I would stipulate that purgation for the relief of acute abdominal symptoms is a dangerous procedure.

I will give here the report of four or five

¹Read before the Medical Society of the State of North Carolina, at Asheville, April 18, 1917.

cases taken from this series to illustrate the line of treatment that was followed. The symptoms in these cases are not those the patient had on admission to the hospital, but the symptoms that were present when first seen by the physician who referred the case.

Case 1.—Female, aged fourteen. On the morning of August 15, 1916, this patient was taken sick with general abdominal pain, nausea, and vomiting. Her physician was called in on the afternoon of the same day and prescribed the following treatment: calomel one grain every hour for ten doses, to be followed by magnesium sulphate one ounce every two hours for six doses. Patient admitted to hospital three days later. Immediate operation. Appendix was found ruptured and the pelvic cavity filled with pus.

Case 2.—Male, aged fifteen. This patient gave a history of previous attacks of abdominal colic. On September 20, 1916, he was seized with violent abdominal pains, nausea and vomiting, tenderness and soreness of the abdomen, slight rise of temperature. Three physicians were called in to consult over this patient, and the following treatment was prescribed: calomel four grains, magnesium sulphate four ounces, in divided doses. At operation the appendix was found ruptured, with free pus in the abdominal cavity.

Case 3.—Male, aged sixteen. History of attacks of abdominal colic for the past two years, more frequent during the past six months. Present attack began April 18, 1916, with general abdominal pain, nausea, and vomiting. In a few hours the pain and tenderness had localized in the right side. The following purgatives were prescribed

by his physician in succession: liver regulator one ounce, calomel six grains, magnesium sulphate one and a half ounces, rhubarb four ounces. Patient was operated on immediately after his admission to the hospital. Ruptured appendix was found, with the pelvic cavity filled with pus along with free pus in the abdominal cavity.

Case 4.—Male, aged forty. History of indigestion for the past ten years; attacks of abdominal colic for the past two years. Present attack began April 15, 1916, with abdominal pain, nausea and vomiting, pain and tenderness localizing in right side in a few hours. Patient took a glassful of castor oil, and on the following day sent for his doctor. His physician diagnosed the case as one of ruptured appendix and brought the patient to the hospital at once. The doctor's diagnosis was confirmed at the operation.

These few cases will give an insight into the line of treatment that was carried out in this series between the onset of the attack and the operating table.

Now you ask, what shall we do in these cases? To speak frankly, I would say, "Hands off." But if you feel that you must do something to satisfy the minds of the family and friends, then give nothing by mouth, place an ice-cap over the appendical area, and empty the rectum with a small, simple enema. In case the vomiting continues and is severe, gastric lavage may be given.

In conclusion I will say that we have learned from living pathology that in acute appendicitis "purgation means perforation," and the time has arrived for nature's assistant, the purgative, to pass into oblivion.



TWENTY-FOUR DRUGS MOST USEFUL IN DIGESTIVE DISORDERS.

BY A. L. BENEDICT, A.M., M.D., F.A.C.P., BUFFALO.

Good therapeutics requires the careful choice of drugs, without limit in number. One will use nearly 100 chemic substances, locally or incidentally to disinfection, anesthesia, etc., in the office, and unless limitation of practice is along peculiar lines or unless he refers patients for attention to minor details, the specialist will require almost as wide a variety as the general practitioner. In the course of a few years the total number of drugs prescribed, if one attempts to be discriminating, will run up to several hundred, although the majority will be employed at intervals of months or even years. For example, *oleum tiglii* would count in the writer's total, though used less than half a dozen times in twenty-nine years of practice. However, present conditions involve important economic considerations which render it advisable, so far as possible, to standardize therapeutics, and this may serve as an apology for presenting such a list as the following:

1. Strychnine. This may not only be used as the sole representative of *nux vomica* and several other plants, but to replace all simple bitters. It is also, on the whole, the best general stimulant that we have, and for the very reason on which it has been most strongly attacked—the fact that it acts solely by increasing response to accidental but inevitable excitoreflex stimuli.

2. Hydrochloric acid. The great majority of gastric cases—not of interesting cases, not necessarily of those encountered by specialists—include the suppression or diminution of this secretion as an important if not as the essential factor. Its indiscriminate use is of course unwise, even dangerous, but it is useful in a large proportion of wisely selected cases, and as the failure of ferments is, in the great majority of instances, due to the lack of this substance to complete their synthesis, and as the apparent failure of ferments is still more frequently due to lack of acid alone, the ferments being fully formed, it serves the purpose so far as any artificial supply of a

lack can do so, in at least 95 per cent of instances of what may properly be termed gastric indigestion.

3, 4, 5, 6, 7, 8. Calomel, to the exclusion of other mercurials, cascara extract, Seidlitz powder, phenolphthalein, castor oil, pure mineral oil, cover the ordinary range of cathartics, although various others cannot be regarded as strictly dispensable, and there is no field in which discriminating therapeutics is better illustrated than in the choice of cathartics.

9. Bismuth subcarbonate. This is, on the whole, the most generally available preparation of bismuth, and neither cerium nor any other insoluble, comparable powder is so good. Most of the complaints as to the toxicity of bismuth are due to impure preparations, if, indeed, they may not all be explained in the practical sense, and granting common sense as to dosage and continuance, as due to arsenic contamination.

10. Orthoform. While various other synthetic local anesthetics may be preferred in individual cases, and while cocaine itself cannot be entirely eliminated, either as a gastric sedative or to check certain types of diarrhea, in dealing with habitués, or to anesthetize the throat for the passage of the stomach tube, for esophageal and rectal and sigmoid work (basic), orthoform may be used almost entirely for internal administration, either for directly therapeutic purposes or, in addition, to gain information as to the probable location of a pain.

11. Salacetol. Up to date this seems to be the most efficient and least toxic internal antiseptic, conceding that the term cannot be made to conform to bacteriologic tests, but can be used only in the qualified sense applicable to clinical medicine.

12. Animal charcoal. This is a better absorbent than vegetable, but it must be used dry (though subsequently mixed with water) and in appreciable dose.

13. Kaolin. Rather recently the writer has become convinced that there are cases in which the need of an absorbent in large

dose, and even the claim, put into popular terms, that specific and other bacteria can be "buried alive," require the admission of this substance as a necessary item in the armamentarium. It must be pure, in the sense of being free from all toxic ingredients, and it will not perform the miracles described by the overenthusiastic.

14. Sodium bicarbonate. This is, on the whole, the safest and most efficient corrective of acidosis. In connection with auscultation it affords a convenient and, with experience, a fairly reliable diagnostic test of the presence or absence and even of the degree of gastric acidity. It is the only practical drug in the treatment of extreme hyperchlorhydria or acid fermentation, and the objection that gas is produced and that the effervescence stimulates further acid secretion is by no means so valid as formerly believed.

15, 16. Magnesium oxide and magnesium hydroxide cannot be dispensed with, however.

17. Ammonium benzoate is apparently the best ant-alkali, so far as the general system is concerned, as indicated by the urine, and even the tendency to deposit alkaline calculi in the urinary tract cannot be ignored in the treatment of the alimentary organs. This is true both because a sincere limitation of therapeutics cannot be so rigid as to include the neglect of other conditions, and because such calculus formation is very directly dependent on conditions of the alimentary canal.

18. An organic silver compound. Except as a reagent, silver nitrate can be excluded entirely, but some preparation of this drug is absolutely necessary for the successful treatment of pharyngeal and gastric conditions and of the accessible lower foot or so of the bowel. The writer prefers not to express a choice among the various claimants.

19. Cr  d   ointment. This, or some improved form of colloid metal, must be included here until it has been definitely proved that it has no value either in the treatment of incipient septic conditions, as of the appendix and gall-bladder, or in

stimulating leucocytosis, as in tuberculous and other conditions.

20. Hydrogen peroxide is required, not only as a reagent and as a local application in the strict sense, but through the tube or by swallowing, in the treatment of the stomach, by enema in various conditions of the lower bowel. With it may be included the peroxide of magnesium, the perborate of sodium, and various peroxyoxides, whose separate enumeration would considerably extend the list.

21. Menthol. While admitting that the exact physiologic action of this drug, or of the various preparations of peppermint which it may supersede though not always conveniently, is not based on absolutely satisfactory experimental evidence, it is clinically extremely valuable, though not always wisely used.

22. Camphor, in the specific sense, or a camphor in the general sense, or a volatile oil of some kind, is also required in those cases in which the apparent action of menthol in increasing the local blood supply or its symptomatic burning is contraindicated, while the general indication remains. At present the writer is compelled to use several such preparations, but it is probable that a single agent could be demonstrated to be sufficient.

23. Adrenalin is mentioned, both for its action on certain forms of hemorrhage and because it checks certain manifestations of hyperthyroidism and hyperchlorhydria and serves as a circulatory tonic in conditions practically inseparable from those strictly alimentary.

24. Thyroidin or thyroid extract, the ideal form not being as yet positively demonstrated, if indeed developed, must be included, since the overlooking of inadequate thyroid function would delay indefinitely the relief of many conditions which present themselves as alimentary disorders.

This list does not include morphine, general anesthetics, cardiac drugs, and others often necessary in the general management of alimentary cases, nor does it include cannabis indica, diuretics, a wide choice of

cathartics, glandular derivatives more or less indicated on general principles but not so well demonstrated practically as adrenal and thyroid extract, digestive ferments

rarely indicated but almost imperative when they are really lacking, and a variety of other drugs without which practice cannot be entirely satisfactory.

WRITERS' CRAMP AND ALLIED AFFECTIONS: THEIR TREATMENT BY MASSAGE AND KINESITHERAPY.¹

BY DOUGLAS GRAHAM, M.D., BOSTON, MASS.,

President of the Massachusetts Therapeutic Massage Association.

Overuse of any group of muscles and nerves, especially in fine work requiring a high degree of delicate coördination of individual movements and voluntary impulses, as in writing, sewing, knitting, watchmaking, playing the piano, harp, or violin, etc., gives rise to similar disturbances. So does also, but less frequently, excessive use of muscles in heavier occupations, such as painting, telegraphing, tailoring, shoemaking, blacksmithing, milking, etc., occasion like troubles of motion and sensation. Predominance of symptoms may be of a spastic, tremulous, or paralytic form, with extreme fatigue, pain, formication, hyperesthesia or anesthesia, and thrills like electricity. There may be total inability to perform the accustomed movements, or if they be attempted for a few minutes, the symptoms just named appear. The spasms may be of flexors or extensors; there may be rigidity or contraction of the muscles, local or general tremor. No two cases are exactly alike, as these symptoms are variously combined and usually only called forth on attempting the work that has brought them on, while for all other purposes the hands and arms are well. As I predicted some time ago, we can now add another form of cramp to the list, namely, manipulators' cramp, as the penalty of those who try to do massage without knowing how, and the sufferer supposes that the trouble in his arms is owing to his having imparted so much "magnetism" out of them to his patients—his conceit not allowing him to think that he is only suffering from an unnatural, constrained, and awkward manner of working.

We see but few cases of writers' cramp nowadays and hear very little about it. Sufferers from this consider it a foregone conclusion that nothing can be done for it, and some learn to use a typewriter or hire some one who can. Physicians by their disbelief in the efficacy of any treatment whatsoever have done much to foster this state of mind in their patients. We read in scripture that on one occasion even Jesus Christ himself could not work many miracles on account of the unbelief of those around him; while in the absence of this unbelief we find no less than six references in the Bible to the devil and his emissaries working miracles. Saints or devils, we would all like to be able to cure writers' cramp and allied affections, and it is no miracle to do so in the absence of what is called organic disease of the nervous system.

First and foremost, as to the predisposing causes of writers' cramp: It usually occurs in those who are somewhat neurasthenic, and who write in great haste from the wrist, using the hand and fingers almost entirely for this purpose, and not combining the forearm and upper arm in the side-to-side movements as they ought to do. The fingers, hand, and arm are generally perfect and powerful for every other purpose, sometimes unusually so, and objective symptoms are said to be lacking. Are they? The writer has seen quite a few cases of writers' cramp, and in every one the space between the lower end of the bones of the forearm and the carpal bones has been unusually large—in other words, there has been too long a neck to the wrist. This favors the pernicious habit of moving the hand alone from side to side, thus obviating

¹Read at the Massachusetts Therapeutic Massage Association, June 1, 1917.

the healthful combination of fore and upper arm in these side-to-side movements.

In order to get a case of writers' cramp well, it is largely a question of removing the fatigue, the overexcitation, the irritability which accompany it, as well as a reëducation in proper ways of writing. This involves a careful consideration of many things: the method of holding the pen, of forming the letters, the height of the desk and the position of the patient thereat, the state of the eyesight, of the nerves and muscles, etc. With some patients a long period of rest would seem to be necessary before commencing treatment; others can be kept at their writing and improve by the following methods: They should be taught how to hold the pen easily and not to grasp it tightly, and be shown how to vary the methods of holding the same, if they have not already found out for themselves. Holding the pen between the fore and middle fingers is one of the best methods for relief. The penholder should be of as large a size as will afford a comfortable grasp, and may be of cork or surrounded by a rubber pneumatic appliance at the lower end. The pen should be neither too soft nor too hard, the point of medium size, and the paper neither too smooth nor too rough in order that a proper resistance may be offered, so that the patient's attention may not be distracted thereby. The height of the desk should be on a level with the forearm when the upper arm hangs free by the side. It is often advantageous to change the angle of the paper from time to time, so that the patient may not get tired out from being too long in one position. Writing on a large book on the knees is sometimes easy as it forms a good automatic tip-table instantly adjustable in any direction. The light should fall upon the paper in such a way as not to cast a shadow, either from in front or on the right side.

Fine complex movements that are the last acquired are soonest lost. Therefore, re-education leading back to these should be gradually begun by teaching the patient to make long parallel lines from left to right, and sometimes also from right to left. This

is a good preparation of the upper arm for free-hand writing. After this the patient should be taught to make whole lines continuously of large l's with wide interspaces, and also the reverse of these with equally as large spaces, m's. These may be done either slowly or rapidly so as to break up the habit that the patient may have acquired. With improvement and facility in execution they should be gradually decreased in size. The advantage of this is that it trains the upper arm and forearm to coöperate with the hand in these movements that are so necessary for easy writing. Later a combination of letters and words must be devised to get the patient over any special "hitches" he may have. The word *legacy* offers a good combination for this purpose. After having made l's for a while the patient can then practice *lelelele* until it becomes easy; then *legleglegleg* continuously until this can be done with great ease, and so on to the end of the word.

When the patient has become somewhat proficient in writing, an excellent exercise is to write the capital letters of the English alphabet connectedly as far as he can. He can usually go from A to I without a break. The writer after having devised and employed this combination for years found that Professor Zabłudowski of Berlin had independently and unknown to either of us been doing the same thing. Exercises of flexing and extending and separating the fingers, gradually increasing in vigor and duration, should be done three times daily, and for any one predisposed to writers' cramp these exercises form a good preventive measure.

Careful and skilful massage of the fingers, hand, fore and upper arm, and also of the upper part of the back, should be done daily for a while at first, and later every other day. It should not be that kind of massage that is so prevalent, and consists mainly of allowing the hand and fingers to slip on the surface, but deep and searching and gentle without chafing the skin or bruising the muscles. Alternating with the massage every five minutes should be given resisted movements of supination of the

forearm, of extension of the hand and of each finger separately. Much tact, skill, and practice are required to adapt these resisted movements to the strength of the patient, and no novice had better undertake them. When done properly they are restful and invigorating in place of annoying and fatiguing.

The writer, in an article on "Writers' Cramp and Allied Affections" in the *New York Medical Record* of April 28, 1877, said of these movements that they tend to restore a harmonious distribution of will, nerve, and muscular effort by counteracting the motions that have produced the trouble. Dr. George W. Jacoby said of this suggestion that it was of more real value than all that Julius Wolff, the so-called inventor of the cure of writers' cramp, had ever done. It was in 1882 that Mr. Wolff and the distinguished Drs. Schott of Nauheim got into an unseemly squabble as to priority of the use of massage and exercises in the cure of writers' cramp, five years after the publication of my article on the same subject. Wolff had the best of the argument.

The indications for the use of massage in these or any other cases could not have been better laid down than has been done in the following words: "A really effective treatment of scriveners' palsy must be an agent which is at the same time both tonic and sedative in its neural effects, which must have the power of restoring the circulation of the blood in the suffering parts to its proper condition, which is capable of promoting the absorption of serous effusions, and will thus cause the nutrition of the maimed ganglia to be raised to a normal standard." "By stirring up the nerves and muscles of a limb you may," says Russell Reynolds, "to a certain extent act upon the other ends that are in the brain and spinal cord, and so improve the nutrition of the brain and spinal cord."

F. K. A., aged twenty-four years, weight 138 pounds, in good general health, and has excellent muscles, came to me on the 3d of May, 1915. For about five months he had suffered from almost total inability to write, which came suddenly after a hard

day's work of eight or nine hours at his profession as assistant editor on one of our large monthly magazines. His usual day's work was four or five hours of writing, often stopping to think between times. After signing his name a few times he had pain in the interosseous spaces between the metacarpal bones. He had no cramp, no tremor. Tried writing with his left hand, which soon brought on pain in the region of the musculospiral nerve and insertion of the deltoid. Playing the piano or using the typewriter soon brought on the same disagreeable symptoms. Hands and arms were perfect for every other purpose. A few days of rest afforded him temporary relief. His physician had told him that he was suffering from neuritis and that it would take him a year to get over it. Under the plan of treatment above outlined the patient made a good recovery with variations. Sixteen days after he began treatment he wrote 300 words with ease, and two months after he started he could write 1000 words without any difficulty and no more fatigue than any one might feel.

May 19, 1917. This patient has returned to Boston from another city, where he has been practicing his profession for the past two years. He reports that he has continued well for writing in spite of the fact that six weeks ago he had the grip, which was followed by hives, acute indigestion, and jaundice. He can still write all he wishes, 1000 words or more at a time if necessary, even though his general health is not yet up to par. He comes to me again for neuromuscular pains in back and legs which are so common after the grip, and for which massage is so beneficial.

H. W., aged twenty-five, enjoyed good health and had strong muscles; by occupation a pianist and astronomer. For a year his wrists had been weak and lame, which he attributed in great part to the frequent and forced efforts required in elevating and changing the direction of his large telescope, which strained the extensors of his hands very much. He could play but fifteen or twenty minutes on his piano before his fingers and wrists gave out from fatigue

and ache. No visible or tangible defect could be found save a somewhat constrained, stiff-bent position of the fingers, making voluntary extension difficult and disagreeable.

The treatment for several months had been half a dozen layers of bandage wound around each wrist, and rubbing with liniments, without any improvement. These were left off when massage was begun. The first four visits were devoted solely to manipulation of the fingers, hands, and arms. I find my notes quote Mr. W. as saying that his hands and arms felt stronger after the first handling. At the fifth and subsequent massages I added percussion and resisting motion to all the natural movements of the fingers, hands, and arms, but more particularly to *extension* of the fingers and of the hands on the forearms, and this was carefully kept within the limits of the patient's strength, so that at no time should he be made painfully conscious of his disability, as this would have frustrated the object of the treatment. In thirteen days from his first visit to me he had eight massages, at the end of which time I again find my notes quote him as saying that "If any one had told him that his wrists and hands could have been made so much stronger as they now were in so short a time, he would not have believed him." He could then elevate and move his telescope about with ease, and play on his piano for an hour at a time before fatigue came on. Massage was continued for a few weeks longer and the patient got quite well, so that he could use his upper extremities *ad libitum* for any mortal length of time. He continued well, and for his scientific attainments was employed by the United States government in a situation requiring a man physically perfect.

He had been suffering from muscular asthenopia (fatigue of vision) for a long time, which is quite analogous to writers' cramp. Under massage of head, face, and eyelids he recovered so that he could read whole pages of the Bucher trial in the newspapers, and see stars in the daytime without falling on the sidewalk.

Mr. A. J., thirty-one years of age, was referred to me by Dr. George W. Gay. He was in good general health, and his muscles were well developed. It was two years before this that he first observed that he was not writing with his usual ease and accuracy, as if out of practice. He is a professor of writing in a commercial college. He gradually grew worse, so that he had to use a larger penholder and grip it harder and harder. Occasionally there were days when he could write well and easily. It was just after doing some very fine writing that had to be reproduced, and which he first outlined in pencil, that his difficulty began. When he first came to me he could write a few lines well and naturally, then the hand and arm became tired, the hand jumped and trembled, he grasped the pen more firmly, and as the fingers contracted he lost his grip altogether; so that he presented three phases of writers' cramp—tremulous, spastic, and paralytic—in one or more of which it usually occurs. When well he wrote with his hand in the so-called regulation position, resting on the tips of the little and ring fingers, but gradually he had to let his hand descend so as to write while resting it on the whole of the middle phalanx of the little finger, and using the muscles of the forearm rather than those of the hand and fingers. At times the forefinger alone would jump from the penholder, and then he would hold it down with the thumb and endeavor to continue writing.

Examination of the hand revealed almost nothing—apparently slight stiffness of motion in the interossei between the metacarpal bones of the index and middle finger, but not more than is often met with in those not troubled with writers' cramp. There was, however, not full strength in extending the fingers, which would point to over-use of the flexors and the need of the extensors to counteract this.

It was not till after I had seen the patient a few times that he told me that nine years before he had sprained his back by attempting to shut a heavy trap-door in a steamboat. He was beneath it, with his hands and arms extended over his head, when the

boat gave a lurch, and he was suddenly thrown backward. For this he had constantly worn a corset which enveloped his whole trunk in order to support his back. With this he was comfortable, and did not require to lie down to rest during the day, but without it he drooped and sagged down, and soon a burning spot appeared about the middle of the dorsal region. Examination proved that there was nothing at all the matter with his back unless it were muscular weakness, due to having worn the corset too long. After two massages the patient felt as if he had a new back, and could go for half a day without his support, and in the course of two or three weeks it was laid aside entirely. If the condition of his back had anything to do with his trouble in writing, the latter ought to have appeared much sooner. Neither do I think that imagination had anything to do with his writing, for he did not know what was the matter with him until the day he was sent to me.

To keep the patient at his work, and at the same time attempt to get him well, was the problem to be solved. For home exercises I prescribed at first active extension and separation of the fingers, and later the same against resistance by means of rubber bands and tubes, so many movements at stated times, in order to bring into greater action the less used extensors, and also to give a change of exercise to the interossei, and thus help to restore the lost equilibrium of will, nerve, and muscle. But to prescribe writing exercises for a patient whose chirography was like copper-plate did not seem so easy a matter. However, I had no difficulty, for it was evident that he was painfully slow and particular, and when fatigue came on after a few lines he had hitches in rounding the backs or left lower curves of his l's and e's, and in making the upward stroke of the leg of his g's. Therefore, for home exercises in writing I directed large l's made quickly and continuously, followed by the reverse of these, making m's, so as to compel him to write from the upper arm and shoulder. As time went on we gradually reduced these in size, so as to bring more into play the muscles of

the forearm and hand. When he had become proficient in these, the next exercise was a little more difficult, and consisted of *lelelele*, large and rapid at first, then gradually diminishing; and later the exercise was *legleg*, practiced in the same manner, many lines at a time, and in this way he soon got over his hitches and halts.

But calisthenics and elementary writing exercises, though helpful, have never been known to cure a case of writers' cramp without other assistance. For this purpose I gave the fingers, hand, and arm massage, deep manipulation, almost daily for four weeks. After the first two massages the patient wrote with unusual facility, but tired as soon as usual. After the third massage he was fatigued at the end of the first line, and it is a wonder he did not give up treatment then, as these cases are apt to do. After four massages he wrote with greater ease, and made delicate movements of fingers and thumb, which he had not been in the habit of doing, and he was but slightly fatigued with ten lines. After the third massage, which included the back, he was almost faint with hunger, though he had just had dinner before coming to me. I have observed the same effect in other cases, in one a physician, from percussion alone for a few minutes on the back. At the fifth visit there was some lameness of the muscles of hands and arms from the manipulation, which had not been rough, and this is generally a good omen. He thought the writing exercises which I prescribed for him were excellent practice to train his boys at the commercial college to write a free, easy, and rapid hand, so he used them for that purpose. After the fifth and sixth massages he wrote still more easily and for an hour and a half each time, stopping occasionally to explain to his students. At the end of nineteen days he had no difficulty in grasping his penholder, and he could write with ease for three hours, and at the end of twenty-eight days he wrote with ease and fluency and animation. And thus he improved, with variations, but all the time making a better average.

At times we had to call a complete halt

for a few days in his home exercises, when it was evident that he was overdoing and getting his nerves and muscles into an irritable condition, which was relieved by massage alone. But when this condition has arisen of its own accord or from writing, in other cases, it might be an indication to urge them on with exercises in order to tire out the affected nerves and muscles and their central connections, and thus allay overexcitability. The same means incite nerves and muscles that are inactive, but here, in order to be of benefit, must stop short of overexciting them.

Our patient might have been discharged at the end of four weeks, but this was not in accordance with his wishes, for he did not then feel safe without the aid of massage, so he continued to visit me two or three times weekly for several weeks longer. At the end of six weeks, though he was generally fatigued from sickness and death in his family, he had not the slightest difficulty in giving his writing-classes full instruction from nine to twelve o'clock, and it was during the last ten days of this time that I thought it well for him to have a tonic consisting of five minims of tincture of *nux vomica*, twenty minims of *cascara cordial*, with thirty-five drops of elixir of *calisaya*, three times daily. He called upon me again ten weeks from the time I first saw him to report that he had attained perpetual motion, for the longer he wrote and the more he exercised, the easier it became and the better he felt. I have heard from him recently, and he has continued well. Without this patient's hearty coöperation he would doubtless have sunk into the slough of despond.

From 1877 to 1882 Julius Wolff, of Frankfort-on-the-Main, had treated by massage and gymnastics in all two hundred and seventy-seven cases of writers' cramp and such troubles. Two hundred and forty-

five were writers' cramp, and one hundred and thirty-two of these were said to be radically cured, twenty-two improved, and ninety-one without result. Thirty-two were pianists', violinists', telegraphers', and painters' cramp; and of these twenty-five were said to be cured. In all one hundred and fifty-seven were cured, twenty-two improved, and ninety-eight not cured. Of the one hundred and thirty-two cases of writers' cramp cured, one hundred and eight were men, twenty-four women; eighty-eight of the men were married and twenty single. Most of the women with writers' cramp were widows. Wolff usually gave his patients two séances a day for a month.

The advantages of massage and gymnastics in the majority of cases of writers' cramp and allied affections would seem to be removal of painful fatigue, spasm, tremor, weakness, incoördination of motion, feelings of constriction or tension, and disturbances of sensation. Hence, so far as we can judge, this method is capable, in many cases, of fulfilling therapeutic indications of the utmost importance, such as removal of increase and decrease of resistance in the paths of conduction, excitation, and motion; restoration of harmonious co-operation of individual movements, of natural conductivity and excitability, as well as of muscular sense and muscular effort; in a word, correction of underaction and overaction of muscles, nerves, and their central reflex apparatus. Impalpable trophic disturbances of the coördinating machinery in the central nervous system are regarded as the origin and predisposing cause of writers' cramp and such maladies. If massage excels galvanism in correcting these disturbances, as would seem to be the case, it must indeed be a remedy of rare value and worthy of being used by the most skilful physicians.

520 BOYLSTON STREET.



THE HYPODERMIC USE OF IRON.¹

BY L. W. ROWE, M.S., DETROIT, MICHIGAN.

The use of iron internally as a tonic in cases of anemia has been for years and still is a common procedure. This treatment is entirely safe, but is also somewhat unreliable, due to the incomplete absorption and assimilation of the iron. The difficulty has been only partially obviated by the internal use of complex organic preparations of iron, several of which have been placed on the market.

In recent years the hypodermic administration of iron has become increasingly popular. For this purpose the iron is usually presented in the ferric form as iron and ammonium citrate, since this is one of the least irritating and most soluble of the salts of iron.

Largely due to the comparatively complete and rapid absorption which follows the intramuscular injection of a solution of an iron salt, the toxic action of the iron is sometimes evidenced, and reports of severe systemic reactions following the hypodermic injection of iron are not rare. Meyer and Gottlieb state that the hypodermic M. L. D. of iron for dogs, cats, and rabbits is about 30 mg. per kg. body weight. The average therapeutic dose is very much smaller than this, and even then it occasionally causes trouble.

Experimental work in which iron in some form has been given by mouth to animals has been reported frequently, but very little animal experimentation has been carried out in which the iron was administered hypodermically.

It is the purpose of this short article to report the results of some experiments in which iron and ammonium citrate solution was administered hypodermically to dogs and guinea-pigs and to suggest a possible reason for the apparent inconsistency which exists between clinical evidence reported by physicians and the results obtained by animal experimentation.

A series of experiments was carried out

upon dogs to determine the effect of intramuscular injections of iron citrate solution.

Protocol No. 1.

White bulldog, weight 16 kg. Injected intramuscularly with 1 mil (Cc.) of 10-per-cent solution of iron and ammonium citrate (green) (about 1 mg. of iron per kg.) each day for four consecutive days. No noticeable symptoms were observed even as late as two weeks after the series of injections had been completed.

Protocol No. 2.

Brown bulldog, weight 17 kg. Injected intramuscularly with 2 mils of 10-per-cent solution of iron and ammonium citrate (green) (about 2 mg. per kg.) each day for four consecutive days. No evidence of any toxic action was observed. Absorption of the material injected was rapid and caused no unusual irritation.

In these experiments no untoward effects were observed following the intramuscular injection of iron citrate solution, although the larger dose is twice as great as the average human therapeutic dose.

A second series of experiments was carried out upon dogs to determine the effect of intravenous injections of iron citrate solution.

Protocol No. 1.

Brown dog, weight 10 kg. Injected intravenously with .6 mil of 10-per-cent solution iron citrate (green) (about 1 mg. of iron per kg.). No untoward symptoms observed.

Protocol No. 2.

Black and white dog, weight 7 kg. Injected intravenously with 1.5 mils of 5-per-cent solution iron citrate (Italian, green) (about 1.5 mg. of iron per kg.). No reaction observed.

Protocol No. 3.

Brown dog, weight 10 kg. Injected intravenously with 2 mils of 5-per-cent solution iron citrate (Italian) (about 1.5 mg. of iron per kg.). No reaction observed.

¹From the Research Laboratory of Parke, Davis & Co., Detroit.

Protocol No. 4.

Black dog, weight 8 kg. Injected intravenously with 1.25 mls of 10-per-cent solution iron citrate (about 2.4 mg. of iron per kg.). No reaction observed.

Protocol No. 5.

Brown dog, weight 10 kg. Injected intravenously with 3 mls of 10-per-cent solution iron citrate (about 4.5 mg. of iron per kg.). No symptoms.

Protocol No. 6.

Black dog, weight 8 kg. Injected intravenously with 1.5 mls of 10-per-cent iron citrate solution (about 2.8 mg. of iron per kg.) which had been neutralized with sodium carbonate and an excess of the carbonate added. This slightly alkaline solution did not cause any toxic symptoms.

A third series of experiments, using guinea-pigs as the test animals, had for its object the determination of the subcutaneous toxicity of iron citrate solution.

Protocol No. 7.

Guinea-pig, about 300 gm. weight, injected subcutaneously with 1 mil of 10-per-cent solution iron citrate (about 50 mg. of iron per kg.). Pig died within twelve hours.

Protocol No. 8.

Guinea-pig, about 300 gm. weight, injected subcutaneously with .5 mil of 10-per-cent solution (about 25 mg. of iron per kg.). Pig died within twenty-four hours.

Protocol No. 9.

Guinea-pig, about 300 gm. weight, injected subcutaneously with .4 mil of 10-per-cent solution (about 20 mg. of iron per kg.) Pig lived.

Protocol No. 10.

Guinea-pig, weight about 300 gm., injected subcutaneously with 1 mil of 5-per-cent solution iron citrate (Italian, green) (about 25 mg. of iron per kg.). Pig died about two days later.

The last four experiments (7 to 10 inclusive) indicate that the toxicity of iron citrate solution (green), when administered subcutaneously to guinea-pigs, is about 1.5

mls of 10-per-cent solution or 0.15 gm. of the salt per kg. body weight (about 25 mg. of iron per kg.). This compares favorably with the results reported by Meyer and Gottlieb, since their dose is based only on the amount of iron in the compound, and they used larger animals.

Schmiedeberg speaks of the marked toxicity of the double salts of iron when a solution of these is rendered weakly alkaline in reaction and injected subcutaneously or intravenously. Protocol No. 6 failed to corroborate the work of Jacoby as cited by Schmiedeberg.

The experiments reported in this article are largely negative and do not bear out the occasional unfavorable clinical reports. However, in severe cases of anemia in which iron is used as a therapeutic measure it should not be so surprising if, sometimes, a rather marked systemic reaction is observed. The dose generally used in such cases is too large to be absorbed properly and the iron entirely changed into hemoglobin. The experiments carried out upon healthy dogs represent a much more vigorous therapeutic treatment than that from which some human patients have been reported to have suffered severe reactions. There is no mention made in any of the standard works on pharmacology that dogs are unusually resistant to the toxic action of iron, so that the difference between the results on animals and those reported by physicians must be accounted for in some other way. The most logical explanation of this difference seems to be that the anemic patient, due to his lowered vitality, is unable to assimilate large doses of soluble iron salts and systemic disturbances result.

The local irritation produced by the hypodermic use of iron solution is frequently encountered. In experiments upon healthy animals the local irritation produced has not been found to be sufficient to merit serious consideration. However, as in the case of other heavy metals, iron apparently causes considerable local irritation when injected hypodermically into anemic patients. This difficulty will probably never be entirely overcome until a satisfactory colloidal solu-

tion of iron is prepared for hypodermic administration.

Ferric ammonium citrate when properly prepared can usually be safely used hypodermically in a dose of 0.1 gm. (1 mil of a 10-per-cent solution). Sollmann makes a similar statement with regard to *ferric citrate*. However, in severe cases a smaller dose of a less concentrated solution is apparently better suited for hypodermic administration if an undesirable systemic reaction is to be avoided.

The conclusions to be drawn from the experimental data submitted and from the small amount of available literature on the subject are:

First, that animal experimentation does not corroborate the untoward clinical results that are frequently obtained in the hypodermic use of soluble iron salts; and,

Second, that the most logical explanation of these untoward clinical results seems to be that the weakened patient is unable to assimilate the iron properly and symptoms of poisoning consequently occur.

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SYPHILIS IN INTERNAL MEDICINE.

To the *Boston Medical and Surgical Journal* of July 19, 1917, BOARDMAN contributes a paper on this very important subject. He thinks that all writers at present call attention to the necessity of protecting the heart in early syphilis from sudden or severe strain, as one would do in any other acute infectious disease, in order to avoid later heart complications. Fortunately, the treatment of the early lesions is, usually, pretty thoroughly carried out, for then there are other and very obvious symptoms of syphilis which make the patient follow up the physician's instructions. But too much stress cannot be laid on the fact that the

treatment of syphilis which is given must be intensive and prolonged. In these early cases, outside of hygienic measures such as rest, cardiac medicaments such as digitalis, etc., are not needed and are better not employed.

In the later cases one often meets with a patient in whom a thorough course of ordinary cardiac treatment, with rest in bed and digitalis and other cardiac remedies, has failed to establish compensation, and the condition is pretty discouraging. It is just in such cases as this that we often see the most satisfactory improvement follow a course of intensive antisyphilitic treatment. If there is no immediate urgency, it is safer to commence with mercury, preferably injections of insoluble salicylate of mercury, which is given once every five days or a week into the muscle. Inunctions do better in some cases, using the strong 50-per-cent ointment or one of its less disagreeable substitutes. In a week or two we may start with the salvarsan, which is more permanent in its beneficial effects and seems to cause no more serious collapse in these cardiac cases than the neosalvarsan, though the immediate effects of the latter may be just as striking in the way of relieving symptoms. Salvarsan should be used with great caution in these cardiac cases, beginning with a very small dose and increasing only after the effects are well borne. Most especially in cardiac cases with disease of the myocardium and irregular heart action must one use great caution with the first dose of salvarsan.

Brooks reports two cases of nearly fatal collapse following the initial dose of salvarsan, and Boardman has seen one in consultation where salvarsan, given at Boardman's suggestion, was followed by a fatal result in a little over twenty-four hours, in a case of heart block. It is fair to state, however, that in Boardman's case the patient was nearly *in extremis* when the salvarsan was given; it was administered only in the forlorn hope that something might be done for the patient, and it was evident that it must be done quickly if the life of the patient could be saved

at all. In another such case Boardman would suggest salvarsan, but in a dose of only 0.1 or 0.15 gm. In cardiovascular cases it seems to be better to give the doses of salvarsan far apart, continuing the mercury in the meantime. There seems to be no doubt that mercury alone will cure many cases of cardiac syphilis, but the addition of salvarsan surely does it with more speed and relieves the symptoms more quickly. It is also true that salvarsan alone will cure many of the earlier cases and possibly a few of the later ones, but it is too early to know of the permanence of these cures, and, in the few where salvarsan has been used alone, its effects do not appear to be nearly as lasting as when it is backed up with an intensive course of mercury. If the case does not seem to improve under one form of mercury it sometimes is advantageous to change to another. Anders and Brooks both mention cases that after a while seemed to do pretty well on mercury by mouth, though these are rather the exception.

As regards the duration of treatment with mercury and salvarsan, it is hard to lay down any rules. One should try, if possible, to get a negative Wassermann reaction and continue the mercury at least one year after this is obtained. But a negative reaction is sometimes not obtained at all, and if, after a couple of years, the reaction is not altered from the original strong positive, it may be better to give an annual or a semiannual course of mercury to make sure that the disease does not return, provided that the limit of improvement seems to have been already obtained clinically. Often the patient seems to have become immune to the effects of mercury, and it is therefore better to give it to the limit of tolerance and then stop for a while before giving any more.

The ordinary treatment with usual cardiac remedies should be in no way neglected, although they often do not seem to accomplish such definite results in these as in ordinary cardiac cases from other causes. In regard to iodides, the present

idea is that they do not act in a specific sense, but merely absorb the products of inflammation and exudation after the cause has been removed by mercury and arsenic. From this point of view it is advised not to use them at first, but only after considerable treatment with mercury and arsenic. They do not need to be pushed very high, five to fifteen grains t.i.d. doing apparently as well as the larger doses. When once commenced they should be continued until their maximum effect is obtained, if any improvement is noticed, otherwise for a few months.

Now in regard to the prognosis in these cases. Under ordinary treatment the duration of life is usually about two years after the onset of symptoms. On the other hand, unless too far advanced, one can almost surely promise a prolongation of life by the specific treatment. In the secondary cases, with very rare exceptions, one can promise a cure in practically every case, regardless of the apparent hopelessness in some cases. In tertiary cases the inability to repair the heart muscle and the artery walls makes a cure impossible where much serious damage has been done. Post mortem in a well-treated case, one finds a fibrosis of the heart muscle, or an occluded coronary artery surrounded by fibrosis, or, if there has been a true aneurism, this persists; and the same is true regarding damage to the valves, but under the microscope no active foci which can be diagnosed as syphilis and no *spirochætæ pallidæ* are found. Clinically the results compare very favorably with treated gummata of the bones and other places, and one can never tell how much irretrievable damage has been done until a thorough course of treatment, both with antisyphilitic and ordinary cardiac remedies, has been tried. Good effects are often astonishing. Cases, however, in which through neglecting treatment the symptoms have relapsed, do not as a rule respond so readily a second time. Where combined antisyphilitic and cardiac remedies fail, the downward course is usually pretty rapid.

EDITORIAL.

BLOOD-PRESSURE AND SHOCK.

It may be fairly stated that when a great difference of opinion exists between medical men as to the better plan of treatment of a given disease the best plan has certainly not been discovered, and the greater the number of remedies which are advocated by different contributors to medical literature the greater the probability that none of them are peculiarly successful.

Somewhat the same condition of affairs exists in regard to certain questions which are more or less constantly debated, often with wide divergence of views, as to the subjects of anesthesia and shock. Ever since anesthetics were first employed medical literature has been loaded with a perfect myriad of articles, many of them of great interest and value, and yet the subject has not been satisfactorily solved to the extent that every one has agreed as to the best anesthetic for an individual case, nor are physiologists and practitioners in accord with themselves or each other as to the condition which is commonly called shock. Various ingenious theories have been advanced by different writers, and some of these have been as far apart from one another as they could possibly be, ranging from Henderson's theory of acapnia to Crile's ingenious conclusions concerning changes which take place in the cells of the central nervous system, in the presence of this grave complication of accident or surgical procedure.

Within a few days of one another several papers have recently appeared upon this important subject. In one of these Pike and Coombs expressed the belief that if the cells of the brain and medulla oblongata are deprived of blood for a period of from ten to twenty minutes, a change in the staining reactions of the cells is demonstrable; that there is a greater susceptibility of these previously damaged cells to strychnine; and that strychnine seems to emphasize rather than diminish the faulty function of these cells. If the circulation is restored, respira-

tion, blood-pressure, and pulse-rate soon become normal because the damaged cells recover, but we question whether it is fair to compare a condition in animals in which the brain and medulla oblongata are deprived of blood for a period of from ten to twenty minutes to that which is present in a human being suffering from surgical shock. In one instance the deprivation is complete; in the other it is almost certainly very incomplete. Whatever the condition of these cells may be, Pike and Coombs, nevertheless, believe that some means of raising the systemic blood-pressure is necessary in the treatment of surgical shock.

On the other hand, in a most valuable and interesting communication contributed to the *Boston Medical and Surgical Journal* of June 21, 1917, by Cannon upon "The Physiological Factor in Surgical Shock," we find that a somewhat different problem is presented. He, apparently, utterly condemns Henderson's theory that the respiration is a primary factor in shock, and that the condition of excessive pulmonary ventilation so diminishes the carbon dioxide content of the blood as to produce acapnia, which in turn he believes to result in the circulatory changes which are characteristic.

Cannon also discusses the work which has been done by other investigators upon the possibility of irritation of the respiratory center and increased respiratory activity as factors in shock, and concludes that the respiratory changes are not primary but secondary in character, just as respiratory changes under chloroform are more a result of disturbed circulation in the medulla than a direct effect of the drug upon the respiratory center. He also fails to support the theories which have been advanced by Crile. He is in accord with those who believe that it is important to raise blood-pressure, but he denies that the vasomotor center is impaired and believes that the low blood-pressure which exists is due to the diminished volume of blood which is in active circulation, expressing the belief, which is prac-

tically universally accepted, that it is found in the capacious splanchnic area. He points out that clipping the portal vein causes in a short time a fall of blood-pressure equivalent to that met with in severe hemorrhage, and he reiterates, what has been known by physiologists so many years, that it is perfectly possible for an animal or man to bleed to death in his own splanchnic vessels.

He therefore comes to the conclusion that in shock there is stagnation of the venous blood in the portal vein, which blood is heavily loaded with carbon dioxide, which carbon dioxide causes possibly still further relaxation of its walls. The portal circulation is a peculiar one, since the portal vein lies between two capillary areas, the capillaries in the stomach and intestines, pancreas, and spleen, which deliver their blood into the mesenteric branches of the portal, and the capillaries of the liver, through which the blood must flow before being gathered in the hepatic veins and carried to the inferior venæ cavæ. He thinks that the fall of arterial pressure which is so general in shock results in a condition whereby the circulatory pressure is insufficient to drive the blood through the portal area described. In other words, that the blood once accumulated in the portal area in excess and the general blood-pressure being restored by increased activity of the vasomotor center, there results a contraction of the blood-vessels on either side of the portal system so that the effect of increased blood-pressure fails to drive on the stagnant blood.

The question, therefore, arises as to what can be used to constrict the splanchnic area, and particularly the portal area. Cannon thinks that as the portal vein and its branches have smooth muscles in their walls, which smooth muscle is highly contractile, we must find some substance which will stimulate this muscle to contract, and he therefore brings forward the question as to whether pituitrin, which is a powerful stimulant of smooth muscle, may not prove of great value in reestablishing proper abdominal circulation, since it would cause contraction of the smooth muscles of the in-

testine and thus bring pressure to bear on the radicles of the mesenteric veins lying beneath the intestinal muscular coats. It would also contract the smooth muscle of the larger veins.

Whether this theory of Cannon's, which at first sight seems rather far-fetched, will prove to be correct is still to be determined. Cannon admits that as yet he has not much clinical evidence to support his views. After all his views may be considered only a subdivision of the opinions which have been held so long by those who believe that a low blood-pressure is the essential factor in shock, and who have considered that most of the blood accumulates in the splanchnic area, but who have not gone so far as to chiefly localize it in the portal circulation.

THE PROMPT DIAGNOSIS OF TUBERCULOUS INFECTION.

As treatment necessarily depends, if it is to be accurate, upon correct diagnosis, various measures have been instituted in the study of tuberculosis whereby the physician may become informed as to the presence of this disease in patients in whom its existence is suspected. The use of the skin reaction, as is well known, is of little value after puberty. So, too, in many cases of pulmonary tuberculosis no tubercle bacilli are found in the sputum at the time of its examination with the microscope, yet in these patients, and in patients suspected of having tuberculosis in other parts of the body, an accurate diagnosis is desirable. One of the measures employed heretofore has been the inoculation of the guinea-pig with material obtained from the patient. Aside from certain fallacies in such a test, the great difficulty with this method is that, as a rule, a period of from four to six weeks must pass before the guinea-pig is killed to determine if it has become tuberculous. A number of investigators have recently shown that if the point of inoculation in the guinea-pig is exposed to the x-rays rapid development of tuberculous infection ensues, so that evidences of disease may appear in ten days or two weeks. Last year Morton reported

in the *Journal of Experimental Medicine* that if the belly of the guinea-pig was exposed to a massive dose of x -rays and then the peritoneal cavity inoculated with material containing tubercle bacilli, a tuberculous peritonitis obvious to the naked eye developed within fourteen days or less.

In the London *Lancet* of June 9, 1917, McGrath, of the Bacteriological Department of Guy's Hospital, reports investigations confirmatory of Morton's observations. He exposed guinea-pigs weighing from 200 to 250 grammes for a period of ten minutes to x -rays derived from a Coolidge tube, a current of five milliamperes backing up a $12\frac{1}{2}$ -inch spark. He then inoculated intraperitoneally with sputum or other material rich in acid-fast bacilli, care being taken to exclude pyogenic bacteria. He states that in some instances the animal died very soon, or was killed as early as the seventh day, and that under these circumstances, while there were no tubercles manifest to the naked eye, nevertheless evidence of tuberculous infection was obtained microscopically, tubercle bacilli being found in association with enlargement of the mesenteric glands and other evidences of infection.

While this method of diagnosis demands the skill of some one competent to use the x -ray and some one who is capable of making an accurate bacteriological examination, and, therefore, is not applicable in places where laboratory facilities are lacking, nevertheless it may add materially to our ability to reach an early diagnosis in cases in which these facilities can be obtained, and is therefore distinctly advantageous.

THE EYE, QUININE, AND MALARIA.

It has been known by medical men for many years that the administration of large doses of quinine is capable of producing not only temporary impairment of vision, but actual blindness, and, in some instances, if the dose is large enough, the blindness may be permanent. Many years ago this matter was very carefully studied from the

experimental and clinical standpoint in this country by de Schweinitz and by Holden. The question as to what is a large dose of quinine is not so much the actual number of grains given as it is the susceptibility of the individual who receives it. This is true, of course, of all drugs, but quinine is one of those substances, innocuous to most individuals, to which a certain number of persons have a very definite idiosyncrasy, and de Schweinitz has recorded a case in which sudden complete, but temporary, blindness occurred after fifteen grains had been given in divided doses during twenty-four hours. He has shown that, in some of the lower animals at least, quinine if given in continued toxic doses produces contraction of the retinal arteries and permanent optic atrophy; and Holden has proved that there is degeneration of the nerve fibers and ganglion-cell layers of the retina. In this connection it is important to recall that where the dose is a single one, or it has been given through only a day or two, recovery usually occurs, but if the quinine has been continued after the symptoms appeared the progress toward recovery is not favorable.

Fernandez, of Cuba, has recently written an interesting paper as to the "Influence of Quinine and Malaria upon Vision." He cites a case of sudden blindness which developed when quinine had been administered for infection by the plasmodium. He raises the question, however, as to whether it is always just to accuse quinine of being responsible for the ocular changes that ensue, and apparently it is thought that the cause is in some instances a combination of malaria and the quinine, or the malarial poison alone.

So far as we know there is little information obtainable as to the effect of malarial infection upon the optic nerve, whereas there is a large amount of information at hand to show that quinine, at least in certain individuals, has a very definite affinity for this nerve. In instances in which temporary or permanent impairment of vision results, we would be inclined to attribute it rather to the quinine than to the malaria. There are comparatively few, if any, in-

stances on record in which autopsies on human beings have been able to prove the presence of optic atrophy from quinine, and certainly still fewer from malaria. There are instances, however, in which persons treated for malaria with large doses of quinine have developed visual disorders, and in after years the ophthalmoscopic examination has revealed the fact that some atrophy of the optic nerve has taken place.

The point to be borne in mind would seem to be that when we administer full doses of quinine to a patient who has malaria, and ocular symptoms develop, the drug should be stopped, or the dose very materially cut down, unless the danger to the patient's life is greater than the danger of the impairment of his vision.

THE IMPORTANCE OF COMMON COLDS.

It would appear that many members of the laity recognized that common colds were infectious before the profession was a unit in this belief. From clinical observation it has become increasingly evident that such colds are distinctly infectious, but the scientific evidence of this fact, as made by bacteriological investigation, has not been at hand. In some instances the microorganism of influenza is undoubtedly the cause, but in an equal, or greater, number there is no reason for suspecting that this germ is the responsible agent. Examinations of the nasal secretions usually reveal a myriad of organisms because the nasal mucous membrane acts as a bar to the entrance of these organisms to the deeper portions of the respiratory tract, and in the presence of this great variety of growth it is difficult to determine which one is the dominant factor.

At present it would seem that we have no definite method of combating such infections in their earlier stages. Flexner's recent paper in which Dichloramine-T was advocated as an application to the nasal passages as a means of eradicating carriers of the meningococcus may also prove of value as an application to the form of

infection we are discussing, but practically it will fail: First, because the average individual will not use it in time, or will consider that nasal irrigation is worse than the disease, until the trouble becomes so serious that he is willing to do almost anything. Furthermore, the attempt at nasal douching by the laity only too frequently ends in an infection of the middle ear. The recognition that these colds are infectious, however, and furthermore the bacteriological proof of this fact, is of importance in that it emphasizes the necessity of isolating more or less those who are infected, and this is particularly true concerning the health of children and older persons in whom such colds are not infrequently followed or complicated by catarrhal pneumonia, which, in these two classes of patients, is a serious disease presenting a high mortality. Patients so afflicted should be cautious in the handling of their handkerchiefs, should hold a handkerchief or gauze over the nose and mouth when sneezing, and should keep as far away from healthy persons as the exigencies of life permit.

In an article contributed to the *Journal of Infectious Diseases* for November, 1917, Foster, from an investigation concerning this subject, reaches the following conclusions, which are of considerable clinical importance:

"From the experimental evidence presented it seems that the following facts have been established:

"Common colds of the ordinary type are infectious.

"The ordinary bacteriologic methods that have been resorted to, heretofore, do not furnish reliable criteria on which to base conclusions as to the etiology of these affections. Cultures made from the nasal secretions early in the acute phase often remain sterile, while cultures made later in the attack frequently show such a diversity of organisms that only presumptive evidence exists for ascribing to any one an etiologic rôle.

"It has been demonstrated experimentally that the virus of common colds occurs in

the nasal secretions; and that this virus is capable of passing through Berkefeld filters, which are impermeable to ordinary bacteria.

"By the employment of special anaerobic methods the virus of common colds has been cultivated *in vitro*, and has proved capable of repeated recultivation in sub-cultures.

"Experimental inoculations have demonstrated that Berkefeld-N filtrates of sub-cultures of the virus, in the second generation at least, are infective.

"A peculiar minute microorganism has been isolated from cultures made from the filtered nasal secretions in common colds. This microorganism can be passed through Berkefeld-N filters, and has been recultivated from culture-filtrates. Although conclusive proof of its nature has not been adduced, the experiments suggest that the microorganism described bears a definite relation to the true infective agent."

A NOTABLE CHANGE IN OBSTETRICAL PRACTICE.

However discouraging it may be from time to time to have our preconceived views as to a method of treatment completely reversed, nevertheless, with the advance of experience and science, such alterations of opinion are an evidence of a free mind ever ready to accept that which is good. This indicates that we are not bound hand and foot as to the procedures which we should follow, but are ready at all times to take up that which is new and which contains real promise. Our regret must be that wise conclusions were not reached at an earlier period in order that lives might have been saved.

In this issue of the GAZETTE we print in the Progress columns an abstract of an article entitled "The Treatment of Infection Following Labor" by Bland. This contribution is not noteworthy because it is novel but because it is important, and will, we think, indicate to a very large body of practitioners the trend of opinion and practice amongst gynecologists who have large

opportunities of observation. Up until very recently it was generally considered excellent practice in cases of infection following labor to curette and irrigate the uterus and to go on the principle that this organ must, so to speak, be purged of the infected or contaminated material which it contained. The only difference of opinion seemed to be as to whether curetting should be done with the finger, with a dull curette, or with a sharp curette, and as to the quality and quantity of the fluid which was used in irrigation. So, too, the idea was prevalent that the more foul the odor of the discharge the more necessary was it for surgical interference. We now find an almost complete reversal of these views. As Bland says, odor may indicate the existence of a concealed spark, and if this is fanned by manipulation and instrumentation it may burst into flame. So, too, if the cervix is contracted and closed the opinion now seems to be that it should not be forced open, but that we should allow nature to force it open from the inside only when it finds it necessary, and as a rule to permit nature, by keeping the cervix closed, to exclude infection which might otherwise enter. This plan of treatment is based not only upon constantly accumulating experience in its favor, but upon the very important view that often nature will deal best with infection if left to itself.

At the risk of repeating a statement too often we wish once more to call attention to the fact that all too frequently medical men, in their desire to be of service, consider that strenuous interference is better than masterly inactivity. The result is that nature's processes, which are well qualified to deal with invading microorganisms and competent to induce proper reparative changes, are combated instead of aided, and the tissues already subjected to unavoidable insult are insulted still further. Under certain circumstances it is entirely conceivable that conditions may be present which will demand interference, but, as already pointed out, it is increasingly evident that the motto "Let the patient get well" should be followed in the majority of patients of this type.

THE RELATION OF THE GLANDS OF INTERNAL SECRETION TO THE SEXUAL ORGANS.

In a symposium, made up of a series of articles dealing with the glands of internal secretion, particularly in regard to their relation to sex organs, Frank (*Surgery, Gynecology and Obstetrics*, September, 1917) gives a general résumé of the subject by stating that a hormone may be regarded as the specific product of a secretory cell, and a given type of cell can be expected to produce only one (or more) secretion. Such specific products as we understand most clearly produce distinct reactions, which may be simple and rapid, as that of adrenalin, which stimulates the sympathetic nervous system, or more slow and less immediately apparent in its effects, as thyroid substance, which increases the rate of metabolic activity. In any case, a potent hormone derivative should have a pharmacological activity, which lends itself to standardization, and which can be demonstrated by biological tests. Until this entire concept is grasped and applied, our efforts at organotherapy will remain in their present state of crude empiricism in exact parallelism with the crudity of diagnosis in disease of the glands of internal secretion.

Goetsch, in dealing particularly with the relation of pituitary gland to the female generative organs, observes that disturbances in the pituitary functions are associated with changes in the constituents of the normal hypophysis. Thus hyperfunction is associated with focal or general hyperplasia of the chromophil cells, while hypofunction is associated with certain degenerations, with atrophy, and with tumor formation either of the hypophysis itself or as a result of pressure from tumors arising from a neighboring structure. Such pathological involvement is followed by symptoms of deficient glandular secretion as elsewhere in glandular organs. He holds that between no two of the ductless gland series is a clearer association in function demonstrable than between the pituitary and the sex glands. There is experimental evidence to prove that removal of the pituitary gland is

followed by underdevelopment of genitalia, inactivity and hypoplasia of young animals, and by impotence and sterility and retrogressive changes in the sex glands, together with adiposity in case the animals were adult at the time of operation. The feeding of young animals with pituitary is followed by overdevelopment and increased activity of the sex glands. It is the secretion of the anterior lobe of the pituitary which is responsible for these changes, whereas the posterior lobe secretion if deficient influences in part carbohydrate metabolism, absence of this secretion being followed by a tendency to adiposity in the early stages.

Goetsch believes that many clinical conditions showing genital aplasia, adiposity, and underdevelopment, and dependent upon changes in one or more of the ductless glands other than the pituitary, would be benefited by the feeding of pituitary extract in addition to the extract of the gland which is primarily involved.

Voegtlin expresses the belief, based on experimental evidence, that the parathyroid controls in some way calcium metabolism; that after the removal of this gland the body fluids and soft tissues are deprived of soluble calcium, hence the appearance of the abnormal irritability of the nervous system with all the typical symptoms of tetany. Therefore intravenous injection of 4 to 5 per cent of calcium lactate or chloride almost instantly removes the hyperexcitability of the nervous system, the muscular twitchings, the tachycardia, and the tachypnea, and the animal is greatly relieved of pain. The beneficial effects last for twenty-four hours or longer, when symptoms of excitation begin to reappear. Nor can the continued administration of calcium ultimately save life. Treatment by parathyroid extracts also brought about temporary relief if these were injected. Feeding had no influence, nor was transplantation of parathyroid permanently helpful.

Voegtlin advances the theory that eclampsia is tetany modified to some extent by pregnancy and is due to a parathyroidism.

As to the pineal gland, McCord, writing on this subject, notes that the glandular

elements are few and ill defined; that the nerve fibers in certain animals are of trivial import and the gland undergoes involution changes beginning in the human as early as the seventh year, this involution being pronounced at puberty, though the degeneration is not sufficiently complete to remove the possibility of continued function in adult life. Marburg supplied the pleasing title of "*macrogenitosomia præcox*" to the type incident to pineal tumor. Aside from the pressure symptoms incident to a pineal tumor, general intracranial pressure, usually secondary to an internal hydrocephalus, and diverse oculomotor paralyses and pupillary disturbances incident to pressure upon the quadrigeminate bodies, together with the toxic manifestations due to encroachment of the cerebellum, with ataxic manifestations, there is a constitutional early maturity, pubic hair, general body hair, early change in the voice, precocious mental development, evidenced in the maturity of thought and speech, general body overgrowth to the extent that a child of five or six years may have the appearance of a child of eleven or twelve.

Young animals injected with pineal materials have outgrown their controls of the same age, but no tendency to gigantism has been observed as the normal adult size was approached. Grossly the testes of the pineal fed animals were 50 per cent larger than those of controls. Microscopically the cellular elements were far in advance of controls.

As to the thyroid gland, Marine states that there is evidence in man of a thyroid sex gland interrelation recognizable in the female in association with the development of secondary sexual characters, with menstruation and with pregnancy, and also in the male at puberty to a very slight degree. The meager evidence available would tend to indicate that the interstitial cells of the ovary, and perhaps also the adrenal cortex, play a major rôle in this relation in the female, as certainly the cells of Leydig do in the male.

Thyroid enlargement is of the nature of work hypertrophy to stimulate metabolism

identical in appearance, and so far as we know different in degree only from that seen in simple goitre.

Pappenheimer, after observing that the thymus grows progressively up to the onset of maturity, thereafter undergoes involution, fails to find from a study of the literature any evidence of a decisive influence of thymectomy upon spermatogenesis, or total weight of the testicles. Although it is noted that following removal of the gonads before sexual maturity there is a much delayed involution of the thymus, so that the glands are enlarged in comparison with non-castrated controls of the same age.

As to the relation of the pancreas to the sexual life of a woman, Carlson, whilst accepting the view that these organs are needful for the utilization of sugar for the tissues, does not find that there is at present any evidence of any specific relations of the endocrine functions of the pancreas to the gonads, male or female, or to menstruation, pregnancy, and lactation. Absolute diabetes probably renders conception impossible. Partial diabetes under careful dietary control permits of normal sex life of women, and pregnancy does not aggravate the diabetes. There is some evidence that in late stages of pregnancy the fetal pancreas may function for the mother.

In an article on the "Experimental and Clinical Evidence as to the Influence Exerted by the Adrenal Bodies upon the Genital System," Vincent states that what we call the adrenal body represents the anatomical association of two elements, each of which is derived from a separate and independent system. The adrenal proper, or "cortex," is part of the "cortical" or "interrenal" system. The medulla is simply an accumulation of chromophil cells of the same nature histologically, chemically, and pharmacodynamically, as similar masses of cells in other parts of the body. There is no clear evidence that these two systems are functionally related.

The adrenal medulla (as well as the chromophil tissue generally) is developed from the sympathetic nervous system. Its duty seems to be to facilitate the functions

of this system in certain physiological emergencies.

The adrenal cortex (as well as the "accessory cortical adrenals") is developed from the germ epithelium, and the evidence is now strongly in favor of the view that it has certain important functions in connection with the development and growth of the sex organs.

There is a considerable amount of clinical evidence that tumors of the adrenal cortex are frequently associated with sex abnormalities.

The clinical evidence also favors the view that when cortical tumors occur in the female, an accentuation of male secondary sexual characteristics develops, and simultaneously a hypoplastic condition of the internal generative organs supervenes.

Additional evidence as to a connection between adrenal cortex and the sexual organs is furnished by the enlargement of the cortex during breeding and pregnancy.

Feeding young animals with adrenal gland substance seems to stimulate the growth of the testes.

It is possible that a final solution of the problem will only be arrived at when the more general problem of the relationships between the ductless glands shall have been solved.

The therapeutic value of these studies lies in their suggestiveness rather than any actual large accomplishment in the direction of organotherapy, if the thyroid be accepted.

THE INDUSTRIAL MEDICAL EXPERT.

In a stimulating and suggestive article upon this subject Patterson (*Pennsylvania Medical Journal*, September, 1917) considers the relation of the physician to some of the problems of modern industry and points out the appalling loss of life and function incident to industrial accidents; many, perhaps all, of them preventable. He attributes these in part to the changed industrial relations incident to the formation of huge corporations. The manual workers

who form the basis of these are too often driven by able individuals, so entirely centered in making good from the financial side that they quite forget they are dealing with humans like themselves. From which it has followed that these changed industrial conditions have demanded and received at the hands of legislators an attention so efficient that the life of the employee in so far as his protection from accidents is concerned is almost as carefully safeguarded as that of a horse, or a cow; due only in part to a more enlightened altruism, in some considerable part to the fact that the employer is mulcted for injuries occurring to his employees.

Patterson notes that at a recent International Congress on Hygiene there was a sign which read, "Inspected so many hogs, Protected so many forests, Neglected so many children." He regards the sign as incomplete, for to it there should have been added tolerated human suffering and loss of life through accidents occurring on our highways, in the operation of our railroads both steam and electric, in industry, and by trespassing on the right of way of railroads.

He observes that deaths due to preventable accidents and injuries represent an economical loss to the community at large which is more than \$1,500,000,000. He notes, and wisely, that safety appliances require safe men to operate them, and that in the Commonwealth of Pennsylvania for the year 1916 there were injured 251,488 people, of whom 2587 were killed. The causes of accident were unguarded dangerous machinery; ignorance of employees as to dangerous conditions; doing work unsafely; recklessness and taking chances; speeding up; fatigue. These accidents can be prevented by laws and governmental inspections; by awakening of public conscience and the development of human responsibility; and by an emphatic answer "Yes" to the query that has run down the ages, "Am I my brother's keeper?"

All dangerous machines, all gearing, all belting that comes close to the floor, should be guarded, and these guards will in themselves prevent 25 per cent of the accidents

which have in the past resulted from a failure to thus guard. Moreover, the machine to be safeguarded must be operated by a safe man—one who knows the importance of doing his work safely, and who is thoughtful of others' safety as well as his own; who has been educated so that he has acquired the "safety habit," which is the only habit which never injured any one.

Patterson notes that the unused safety device is of no more value than the good intentions which are said to pave the route to the lower regions, and that education is quite as essential as the guards. Hence in all well-conducted plants the new men are always carefully instructed by those who have proven their acceptance and practice of safe methods. Each plant should have its own safety organization, consisting of a safety inspector, a workmen's safety committee in each shop, a foremen's safety committee, and a general safety committee who should see that proper mechanical safeguards are installed, investigate all accidents, and help in the educational campaign.

Coöperation and harmony are essential between employers and employees in this work. Physical examination of applicants for employment and of old employees at a yearly interval should be an essential feature of the work of the industrial physician. It insures to the employee the correction of physical defects and that his coworkers are healthy. It insures to the manufacturer a knowledge as to the physical condition of his most important raw material, his human labor, and this inventory should be taken once a year as in the

case of all other material. The physician should make his physical examination really a physical classification by which the workman is fitted into the proper niche.

Moreover the industrial examiner should use every effort to see that employees' defects are corrected, since good health is the principal capital of workmen. All employees engaged in dangerous trades should be under the observation of a physician, and those who present the evidences of undue susceptibility should be urged to assume other vocations.

Dust and fumes are the curse of modern industrial life; indeed, Patterson's advice comes down to the responsibility of the man behind the gun based on his own experience. He states that the solution of many of the vexatious problems of modern industry is found by the installation of the competent physician as the head of what has been appropriately termed "The Human Relations Department." He should be the all-important connecting link between employer and employee, bringing humanity into all business, and be the guide, philosopher, and friend of employer, of general superintendent, of foremen, and of all employees. And, moreover, he should devote his technical skill to the elimination of the industrially unfit, the reconstruction of those capable of this, and the proper direction of each in accordance with his physical development. The industrial physician then becomes an expert, and the advice is given in Patterson's article to the schools to adopt means by which at least the preliminary training of such experts may be given careful thought.



REPORTS ON THERAPEUTIC PROGRESS.

THE TREATMENT OF 102 CARRIERS OF AMEBIC DYSENTERY WITH EME-TINE-BISMUTH-IODINE.

In the *Lancet* of July 21, 1917, WADDELL, BANKS, WATSON, and KING make a report on this subject. They state that the behavior of each case under this drug was very much the same.

They practically all were either purged or they vomited, or both. Usually a man who vomited much did not have so much diarrhea, and a man who had much diarrhea did not vomit much; and usually whichever of the symptoms predominated at first, that was the most marked symptom throughout. Very few were violently attacked both ways. Out of the 102 cases, only two or three were not affected at all, either by vomiting or diarrhea, and a few had one natural evacuation daily; while five vomited only once. The worst cases had on some days ten or twelve motions in 24 hours, or vomited five or six or even more times in the day. Of real tolerance of the drug there was none; certainly a number of men as time went on were not so often sick, but that was the best that could be said. The vomiting usually began about an hour after taking the dose, the diarrhea not often sooner than three hours. Two men had violent colic and required fomentations. It was noted that in the vomit the brick-red color of the drug was fairly often seen, showing that the keratin coat dissolved before reaching the intestine.

Various stomach and bowel sedatives were tried to control irritation, but none were of any real use except tincture of opium, and that was only used in extreme cases. The tablets were tried in powder, but the vomiting was sooner produced and increased in intensity, so this was discontinued. A few of the most disturbed cases were kept entirely in bed, which relieved but did not save them from attacks of diarrhea and vomiting.

In the three cases of old carriers the effect of the treatment on the general health

was very pleasing. All three, particularly a staff sergeant of the Indian army, were weak, thin, pale, and depressed; after the course appetite came back, weight was regained, and all three reported that they felt like new men. In most cases, however, the men were, for the time being, considerably pulled down by the vomiting and diarrhea produced by the treatment. All were heartily glad when the ordeal ended and they were set free.

Tables show the curative properties which the drug certainly possesses; but until its preparation has been improved, and its intensely irritating properties abated or removed, a just estimation of its value in chronic dysentery cannot be made.

FRESH LIGHT ON THE TREATMENT OF TETANUS.

The *Lancet* of July 28, 1917, points out that the third edition of the Memorandum on Tetanus drawn up by the British War Office Committee contains the fruits of the experience of nearly a year since the memorandum was first issued. A distinction is now drawn between the directions made for preventive treatment and those concerning curative measures. The former are to be regarded in the light of an army order to be carried out, like smallpox or antityphoid inoculation, "whatever may be the personal predilections of the medical officers in charge of hospitals." The curative measures, on the other hand, are suggestions to the medical officer. Repetition of the prophylactic dose is now insisted on; all wounded men, among whom cases of trench-feet are included, are to receive at least four injections of antitetanic serum at intervals of a week. Emphasis is laid on the necessity of giving a prophylactic dose when any operation is performed at the site of the wounds, even when these are already healed; this dose is best given forty-eight hours before operation. The primary importance of early diagnosis receives

extended treatment. All clinical and experimental evidence, the memorandum runs, tends to show that the chances of successful treatment diminish rapidly as the length of time increases after the first symptoms have been observed; and nurses are warned to give the alarm whenever muscles around a wound are felt to be harder or more rigid than those of the uninjured side.

In regard to curative measures the most important factor is the size of the dose, the object being to saturate the body with anti-toxin as quickly as possible and to maintain this saturation. For this purpose the memorandum suggests the injection of 50,000 to 100,000 units of serum during the first few days of treatment. The intrathecal route is the one recommended, combined, if thought desirable, with intramuscular injections.

The memorandum is a useful summary of the present state of expert opinion on a very pressing topic; the frequent revision to which it has been subjected in the light of experience is a most encouraging feature and inspires confidence in the results shown.

THE ADMINISTRATION OF CHENOPODIUM.

To the *Military Surgeon* for August, 1917, HEISER contributes a paper in which he emphasizes the fact that recent investigations have shown that oil of chenopodium is one of the most effective remedies for hookworm and ascaris infection. It has been successfully used for the commoner varieties of tapeworms and for encysted amebic dysentery. It is regarded by many as more pleasant to take than thymol, for instance, in that it does not produce disagreeable burning sensations in the stomach.

Experience, however, shows that the administration of chenopodium is not always free from danger. Recently there have been reported in Ceylon a number of deaths which have been attributed to the administration of this drug in connection with hookworm infection. This would in-

dicate that chenopodium should be very cautiously given.

It has been customary in Ceylon to administer the oil of chenopodium to adults in the following manner: A light evening meal, followed by a purgative dose of magnesium sulphate. No breakfast, or at least only a very small amount of gruel. At 6 A.M., 1 Cc. of chenopodium; at 7 A.M. and at 8 A.M. a similar dose; at 10 A.M. another purgative dose of magnesium sulphate, after which the normal dietary habits are resumed. The dose for children, of course, is proportionate to their age. The oil of chenopodium is given in capsules which, as a rule, have been filled many months before in pharmaceutical laboratories. Smaller doses than those mentioned were given in the fatal cases in Ceylon.

The first death occurred in a female child, aged twelve. Magnesium sulphate was given at 7 P.M. on March 22. At 6 A.M. on March 23, 8 minims of oil of chenopodium in capsules were administered, and a similar dose at 7 A.M. and at 8 A.M., followed by a purgative dose of magnesium sulphate at 10 A.M. Dizziness and deafness were noted on the morning of March 24. Coma was noted in the afternoon. Death occurred in the evening.

The other case was a female child, aged eight years, apparently in good health. On the evening of April 3, magnesium sulphate was administered. At 6 A.M. on April 4, 4 minims of oil of chenopodium were administered in syrup. A similar dose was given at 7 A.M. and again at 8 A.M., followed by a purgative dose of magnesium sulphate at 10 A.M. Extreme drowsiness with dizziness was noted late in the afternoon. It was reported that the magnesium sulphate had acted. In the evening another dose of magnesium sulphate was administered. At 9 P.M. the child was unconscious. She could not be roused, the jaws were rigid, and it was reported that the second dose of salts had not acted. By midnight the child was breathing rapidly with occasional sighing. Her pulse was 120. Saliva was flowing from the mouth.

Apparently there was no fever. An enema of warm soap-suds, with half a pint of coffee, was given. Shortly afterward, three live roundworms about six inches long were expelled. At 3 A.M. the pulse was 60. There were convulsions of the right arm and forearm. At 4 A.M., April 5, the child died.

Several other cases of poisoning followed by death have been reported from Mississippi, and one from Panama. Numerous reports of deafness extending over a period of months, and other untoward symptoms, come from the West Indies, Korea, and the Federated Malay States. In each instance there is reason to believe that the oil was administered in the same way as in Ceylon.

In Sumatra the oil of chenopodium has been administered over 300,000 times without a record of a death or any untoward symptoms. The oil is given as follows: The patient has the usual noonday meal. At 1 P.M. 1 Cc. of oil of chenopodium is administered, at 2 P.M. another cubic centimeter, at 3 P.M. a third cubic centimeter, followed by 20 grammes of castor oil at 4.30 P.M. The oil is kept in tightly stoppered bottles and the capsules are not filled until one or two days before they are to be administered. It will be noted that the procedure in Sumatra differs from that in Ceylon in that there are no dietary restrictions; that no preliminary purgation takes place; that castor oil is used as a purgative instead of magnesium sulphate; and that the capsules are not filled until they are to be used.

Dr. Salant, of the Bureau of Chemistry, United States Department of Agriculture, has stated that when oil of chenopodium is administered to animals at a time when hunger contractions of the stomach are taking place, poisoning will result from much smaller doses than when there are no hunger contractions taking place. Salant also mentions the fact that any oil, preferably castor oil, acts as a neutralizant to the chenopodium. It is claimed by those who use the oil of chenopodium exclusively in

Sumatra that it is approximately as effective when administered shortly after food has been taken as it is when given on an empty stomach. Darling and Barber, as a result of a recent investigation, draw attention to the danger of the cumulative effects of chenopodium and express the opinion that the treatment should not be repeated under ten days.

THE DIAGNOSIS AND TREATMENT OF ABORTION.

In the *Medical Record* of August 4, 1917, VINEBERG in a long and practical article takes up the treatment of abortion. First, that of spontaneous abortion without fever. If the bleeding is not excessive we can afford to wait to see what nature will do. In many instances the uterus will expel the ovum and its membranes entire, or at most they will remain in the dilated cervix, whence they can be readily removed with the fingers. In other cases, if the bleeding is profuse, we can either tampon the cervix with gauze and wait for the natural forces to expel the uterine contents, or dilate the cervix with a suitable dilator and remove the contents with the fingers, placental forceps, or curette. To Vineberg's mind it makes no difference which of these means is employed, so long as the products are removed and no traumatism inflicted. Personally, he is in the habit of using the placental forceps first and then gently curetting the interior of the uterus, to make certain that all tissues are removed.

In early abortions, say that of six or eight weeks, when the bleeding persists after the ovum and its envelopes have been apparently expelled, Vineberg finds the sharp curette of great value to remove the small remnant within the uterus. It has often been a surprise to him to note how small a remnant may be the cause of profuse protracted bleeding.

When we are dealing with infected abortions, as indicated by fever, our course must be carefully considered. First and foremost we must determine whether the prior interference (for the presence of

fever, with a single exception, is an indication that a criminal abortion, or an attempt at it, has been made) has resulted in removing all the uterine contents or whether the uterus still contains the products of conception. However we may differ in treatment of the latter condition, we are all in accord as to the course to follow in the first contingency. Nothing but harm can result from subjecting an empty septic uterus to active instrumentation. Vineberg has not the least doubt that the bad reputation the sharp curette has acquired in many quarters is due in great part to its frequent employment in such conditions. We have already seen how difficult the determination, whether the uterus is empty or not, may be in a given case. Therefore, when we are in doubt we should refrain from curetting the uterus. From his own observations Vineberg would conclude that just the opposite course most frequently obtains. Just because there is fever a curettage is done, and if the fever persists a second curettage is resorted to, in the conviction that the first curettage could not have been thorough enough. The worst cases of postoperative septic infection that he encounters in the hospital have been cases in which this line of procedure had been carried out. He has already drawn attention to the cases of virulent infection following attempts at abortion of a non-pregnant uterus.

These cases of postoperative septic infection should, therefore, be treated on the general principles of septic infection, rest in bed, plenty of fresh air, proper nourishment, and proper action of all the emunctories.

When we come to the treatment of infected cases with the products of gestation partly or wholly within the uterus, we reach debatable ground. The discussion has arisen only since 1911, when Winter of Koenigsberg published his rather startling paper advocating a "let-alone" policy regarding this class of cases. To be more definite, Winter became dissatisfied with the very high mortality (13 per cent) and large

percentage of morbidity the statistics of his clinic showed with active treatment. Consequently he instituted a different line of procedure. Every case had the uterine discharge subjected to a bacteriological examination, and if it contained virulent bacteria, such as the hemolytic streptococci, the uterus was left alone until the fever subsided, and then the contents were removed.

Winter's article created a great stir in Germany and formed the basis of several publications and discussions. Only a very small minority were in agreement with Winter's contention, while the vast majority were in strong opposition to it. In this country, and particularly in this vicinity, there appears to be a tendency to accept the teachings enunciated by Winter. Theoretically they seem very plausible; for example, the danger of exciting a general infection through the manipulation of the interior of the uterus and setting free the bacteria to enter into the general circulation. But practical experience, Vineberg thinks, has taught us the fallacy of this teaching; at least that is the lesson he has learned from his own experience. In order to test the correctness of his conception, Vineberg had the records of the Gynecological Service of Mt. Sinai Hospital, for the past five years, gone over very carefully. They revealed that during this period there were 287 cases of either inevitable or incomplete abortion; of these there were 60 cases which had a temperature ranging from 101° to 106°. Many of these had admitted instrumental interference, either by themselves, midwives, or doctors, and we were safe in the assumption that all had been tampered with. All of the 60 cases had been curetted or the uterine contents removed, by other means, as promptly as it was feasible, after their admission into the hospital.

In the entire series there were but two deaths. One died nine hours after the curettage with symptoms of pulmonary embolism. The other died of septic pneumonia on the ninth day following a curettage, performed by the then incumbent

house surgeon, who perforated the uterus. The temperature ranged from 101° to 103° during the next few days, and then developed signs of pelvic peritonitis and septic pneumonia. Vineberg has not been able to collect the cases in his private practice; they were all emergency cases, calling for immediate treatment, and no notes were taken of them. But he is convinced the number was quite considerable, accumulating as they have been during several years. He can recall no mortality amongst them; the only deaths he can recall occurred in those cases seen in a moribund condition, in which intervention of any kind was out of the question.

He can see no valid reason, therefore, to change the method he has been following for very many years. There are a few lessons he learned early in his career, one of which is never to insert gauze into the uterus for the purpose of drainage. Formerly he was in the habit of irrigating the uterus, after the curettage, with 50-per-cent alcohol. Latterly he has been using a solution of tincture of iodine of the color of red wine.

There are a few points upon which Vineberg wishes to lay especial emphasis. No curettage should be done without shaving off the hairs of the vulva and scrubbing the vulva afterward with soap and water gently but effectively. This procedure, one would think, is universally followed, and still he cannot recall a case admitted to his service at Mt. Sinai Hospital, when a curettage had previously been done at home, in which this simple but essential procedure had been carried out.

He is aware that there are a great many prominent and distinguished gynecologists who object vigorously to the use of the sharp curette. He will not deny that it is an instrument capable of great harm when not carefully employed, but it has been his experience that more serious injuries have been inflicted with the uterine steel dilator and placental forceps than with the sharp curette. It is not so much a question of the instrument as it is of the man who

handles it. Vineberg has no quarrel with the man who feels he can remove all the uterine contents more safely with the fingers than with the placental forceps. But Vineberg does not expect him to quarrel with the writer because he finds he can do it just as safely, but more thoroughly, with the sharp curette.

When Vineberg is confronted with a case of inevitable abortion, at a period of pregnancy longer than ten weeks, he has for years resorted to anterior colpotomy or vaginal Cæsarian section. Before he adopted this method he used to dread the task of having to empty a pregnant uterus at the third, fourth, or fifth month. It was always a tedious undertaking, attended with a great deal of bleeding, with considerable uncertainty as to whether everything had been removed, and with the constant fear that the uterus might be perforated. It was usual, also, that in removing the fetus piecemeal the head would be severed from the trunk, and the spherical object rolling about the uterus was extremely difficult of removal, trying to both the temper and the patience of the operator. With anterior colpotomy all this is done away with. The procedure now becomes a truly surgical one, unattended with excessive bleeding and with the uncertainty of groping about in the dark. By making a longitudinal incision and exercising due care in coaptating the edges of the wound, the anatomy of the parts is left practically in a normal condition. The risk of entering the bladder can easily be avoided by drawing down the cut edges of the cervix by successive applications of the bullet forceps, and by pushing up the bladder with the gauze-covered finger.

In hydatid mole it is the procedure *par excellence*, at all periods of pregnancy. It enables us to make use of the fingers or the hand, to scoop out the hydatidiform masses, which are not easily removed in any other way. It enables us to determine, with a certainty, that all the contents are removed and that none of the degenerated villi are left attached to the uterine wall.

to form a nidus for probable development of chorioepithelioma, and what is not less important it enables us, also, to palpate the entire uterine wall, to determine whether a chorioepithelioma has not already developed.

In one of Vineberg's cases of hydatid mole this maneuver led to the detection of a hard excavated nodule in the inner uterine wall, which he had no hesitation in diagnosing as a chorioepithelioma. He then and there removed the uterus. The microscopic examination confirmed the diagnosis, and it is not a stretch of the fancy to assume that this early detection of the malignant growth was the means of saving the patient's life.

In conclusion, he says that the diagnosis of complete or incomplete abortion is often surrounded with great difficulties, demanding more thought and consideration than is frequently given to it. Vineberg finds that a common error is to assume too much from the patient's history and not to pay sufficient attention to a careful local examination.

Then as to the matter of instrumental interference, an entire evening might be consumed in relating the instances of fatal septic infections and injuries to the pelvic viscera of a fatal nature, that have been caused by the abuse of the curette. Every practitioner feels himself competent to perform so simple an operation as a curettage, and so he should be. But, either through ignorance or carelessness, Vineberg believes the curette has done more harm than any other single instrument in the surgical armamentarium.

He has already indicated his own views as to the proper use of the curette, and he believes that every practitioner could readily learn to so use it. But his daily experience in private and public practice demonstrates to him that men commonly use it, ignoring the very rudiments of aseptic surgery. The patient frequently is merely placed across the bed and is subjected to a curettage, even without ether and practically never having the vulva

properly prepared. Is it then a matter of surprise that the curette has been condemned so strongly in many quarters? If men were in the habit of opening the abdomen with the same lack of preparation and the same lack of asepsis, the scalpel would properly receive equally strong condemnation. And yet, in Vineberg's opinion, the same care in preparation and in asepsis are required in a curettage as in a laparotomy. That, he may truly assert, has been the guiding principle in his own work, and it is his firm conviction that the absence of untoward results has been in a great measure due to the adherence to these principles.

PITUITRIN.

CONLEY in the *Journal-Lancet* of August 1, 1917, reminds us that pituitrin, or pituitary extract, is an aqueous solution of the active principle of the posterior lobe of the hypophysis cerebri, or pituitary body. The action of this glandular secretion upon the uterus was discovered by Dale in 1907, and it was first used in labor by W. B. Bell in 1909. It seems to affect all unstriated muscular fiber, the blood-vessels, intestine, and bladder, as well as the uterus, but it contracts the latter most markedly. Its action is manifested in from three to ten minutes after hypodermic injection; and labor pains are both strengthened and made more frequent, the effects lasting from thirty to ninety minutes. Pituitrin will not induce abortion, but used with other measures, such as quinine, castor oil, bougies, etc., may aid in bringing on labor at term.

It is always to be administered hypodermically, either subcutaneously or intramuscularly, and in labor always with an anesthetic at hand. In labor it is sometimes injected directly into the uterine muscle through the abdominal wall, when its action is sometimes quicker, but probably no more certain.

Pituitrin has several important uses other than in the field of obstetrics, and these Conley will mention first. One of the most

common uses is in the expulsion of gas from the intestines, accomplished by its characteristic action on the unstriated muscles of the intestines. The most frequent instance is in the intestinal paralysis or atony of postoperative cases. Other instances showing the same action on the bowels, where Conley has used it with good results, are in cases of pneumonia, nephritis, and peritonitis. He cites two cases of nephritis to illustrate: Both were women, about forty-five years of age, and far-advanced cases with cardiac incompen-sation, high blood-pressure, enlarged liver, and extensive tympanites with distress. Conley gave each large doses of physic and numerous enemata (both low and high), all with excellent results as far as fecal bowel movement was concerned, but with no passage of gas. Eserine failed. He injected 1 Cc. of pituitrin, giving a high injection of soap and water by bowel at the same time, and in ten minutes gas was coming forth in abundance. He repeated this treatment from time to time as needed on these patients, with good results, though sometimes having to use 2 Cc. of pituitrin. His opinion is that 2 Cc. initial doses in these cases is better than 1 Cc. and is without danger, and that it works better in conjunction with a high enema administered at the same time, commencing as soon as the pituitrin has been injected.

Another instance in which pituitrin is recommended is in ischuria, through its action on the bladder musculature. Therefore it is indicated in ischuria after abdominal, vaginal, or rectal operations, and ischuria after labor. Conley has noticed that he has never had to catheterize a woman after labor if he had used pituitrin during labor, though this may have simply been a coincidence so far.

In Cæsarian section, pituitrin is of great assistance. It is injected directly into the uterine musculature, just before opening the uterus; thus the uterus is firmly contracted soon after delivery of the fetus, preventing hemorrhage and making it easier for the suture to be taken.

THE PARASITOLOGY OF PYORRHEA ALVEOLARIS.

The *Lancet* of July 14, 1917, reminds us that in recent years the clinical effects which are supposed to result from pyorrhea alveolaris and the causation and treatment of the disease have received a good deal of attention and been the subject of much experimental investigation. The difficulty has been to distinguish amongst the crowd of microorganisms present in the pus from the alveolar pockets those which were primarily responsible for the lesions and those which were merely secondary infections. These latter, however, may be, and probably are, of great importance in the causation of symptoms. Attention has been drawn to the almost constant presence of amebæ in the pus, and the disease has been attributed to their action, but on the whole the balance of opinion is against the view that they are the cause of pyorrhea. It is true that amebæ are nearly invariably to be found, but there does not appear to be any connection between the severity of the disease and the number of amebæ, nor has inoculation of the purified organisms in animals or in the tooth sockets of the experimenters themselves produced any characteristic lesions. With this conclusion Dr. Aubrey H. Drew and Dr. Una D. Griffin in the April number of the *Journal of the Royal Microscopical Society* appear to agree. Taking advantage of the large amount of material passing through their hands at the Dental Hospital, they have investigated very fully the parasitology of pyorrhea, and have described some interesting phases in the life cycle of the amebæ and discovered what they believe to be new species of flagellates. In conjunction with Dr. Penfold they attempted, though without success, to obtain a lytic serum by the injection into animals of pure cultures of amebæ which by their technique they had succeeded in obtaining from the pus. These cultures were able to produce abscesses containing living amebæ when inoculated subcutaneously in the guinea-pig. No complement-fixation bodies could be

detected in the patient's blood serum when alcoholic and saline extracts of the amebic cysts were used as antigens. The important observation was made that cysts which closely resembled the form described as *Entamoeba minuta* are found in the feces of pyorrhea cases, and might give rise to error in the diagnosis of dysentery; these cysts are believed to be those of *E. gingivalis*. The investigation was not mainly concerned with the clinical aspect of the question, but it was noted that emetine was of no value in the treatment. Mechanical injury was thought to play an exceedingly important part in the commencement of the disease, which almost invariably starts as a marginal gingivitis. Following the injury the spirochetæ, such as *Sp. vincenti*, appear to play the chief part in the disease, causing destruction of tissue and the formation of pockets in which pyogenic cocci and other organisms find a good breeding-ground where toxin formation and absorption can go on continuously.

THE TREATMENT OF PATIENTS WITH BRONCHIAL ASTHMA WITH SUBCUTANEOUS INJECTIONS OF THE PROTEINS TO WHICH THEY ARE SENSITIVE.

WALKER in the *Journal of Medical Research* for July, 1917, states that bronchial asthmatics who are sensitive to the proteins found in horse dandruff and in cat hair are relieved of attacks during a series of subcutaneous injections with these proteins. One cannot say as yet how long such relief will last after treatment is discontinued, but some cases have remained free from asthma as long as five and six months while treatment was continued.

Bronchial asthmatics who are sensitive to the proteins in *S. pyogenes aureus* and *albus* are relieved of attacks during treatment with vaccines of these organisms, and in the case of the former relief continues for four to six months after the vaccines are discontinued, but with the *albus* vaccines relief continues for a shorter time after they are discontinued. A second

course of vaccines relieves a relapse of asthma quicker than did the first course.

Bronchial asthmatics who are sensitive to the food proteins are relieved of attacks, and they remain free from asthma while such proteins are omitted from their diet. Subcutaneous injections of these food proteins at weekly intervals do not usually increase the patient's tolerance for these proteins, and such treatment is of little or no value.

Patients who are sensitive only to closely related proteins are the simplest to treat, and those who are sensitive to several types of proteins which are not closely related are the most difficult to treat. This is because at first one cannot judge which protein is the cause of the asthma at the present time, and so several proteins may have to be tried before the correct one is used. This multiple sensitization does not detract from the cutaneous reaction, since each of the proteins to which the patient is sensitive may have at some time been the real cause of asthma. We know that a patient who is sensitive to one protein is very likely, sooner or later, to become sensitive to others.

Patients with bronchial asthma associate attacks with cold air, dampness, changeable weather, winds, menstruation, indigestion, nervousness, irritability, cold, and bronchitis. After treatment with proper proteins these patients become tolerant to such conditions, so that they can be exposed to them without asthma and they become free from nervousness, irritability, and indigestion, without the use of drugs and hygienic measures. There seem to be two types of colds and bronchitis: one type is anaphylactic, and relief or freedom from this attack follows proper treatment with proteins; the other type seems to be caused by bacteria, and frequently vaccine relieves and prevents these.

Throughout this paper the dosage of the proteins is given in minims, because tenths of a cubic centimeter were not always small enough fractions, and Walker had no hypodermic syringes graduated in one-hun-

dredths. The syringes which were used allowed sixteen minims to the cubic centimeter, so that minims may be converted into tenths of a cubic centimeter if one desires.

FATIGUE AND EXERCISE IN THE TREATMENT OF INFANTILE PARALYSIS—A STUDY OF 1836 CASES.

The *Journal of the American Medical Association* of July 21, 1917, contains an important article by LOVETT.

The conclusions presented in this paper have been derived from an impartial study of a large number of figures obtained from carefully studied cases. They seem to show that weight-bearing exercise, such as walking to any extent in the first year after infantile paralysis, is apparently attended with risk, and is followed in many instances by a change from partial to total paralysis in the foot muscles, whereas in other parts of the body this deterioration does not occur.

The evidence of these figures is also definitely to the effect that the right hand recovers much more effectively than the left, which may be interpreted as showing that the use of non-weight-bearing exercise is beneficial.

It is gratifying to find clinical experience indorsed by an independent statistical examination, and Lovett would like to go definitely on record to the effect that he believes that the weight-bearing use of the muscles with or without braces, in the first year following infantile paralysis involving one or both legs, is risky and detrimental if practiced to any considerable extent, and that by the use of non-weight-bearing therapeutic muscular exercises conjoined with little or no walking, in cases affecting the leg, it is possible to secure a class of results with which he, for one, had been previously wholly unfamiliar.

Sayre of New York expresses the belief that the great field in poliomyelitis is, of course, prevention. He agrees with Lovett that the danger of overexercise in the first year cannot be too strongly emphasized;

and the danger of overwork in the first few weeks and months, and also the danger of not noticing a slight paralysis of the trunk and allowing these patients to sit up in a chair. Being propped up in this way is responsible for many lateral curvatures of incurable form, for which the patient later comes for treatment. These children are best lying on their backs, and not being encouraged by the nurse, and often by the physician, to do work that their muscles are incapable of performing.

How long after the acute attack is it wise to attempt to do things for these patients? Before answering this question he says that the wisdom of judiciously directed work cannot be overemphasized. The same facility that a pianist gets by constant practice, the same reëducation of his telegraph lines from his brain to his finger-tips, is the thing which will give us results in those paralyzed cases in which there is some power of regeneration of function still left. When should one tell the parent that it is useless to proceed with this sort of treatment? This question cannot be answered, because years afterwards, when the patient had been abandoned and nothing was being done, the child being left to crawl on the floor because treatment had been considered useless, cases of that sort gain a great deal of power by the intelligent application of exercise—sometimes combined with support, and sometimes not. Some of the neurologists have said that support is useless and should not be applied, because it has a bad effect on the child's mind; but Sayre thinks it has a worse effect on its mind to have it crawling around and not being able to walk. To give it the ability to move around and exercise with its playmates by the intelligent application of apparatus is considered a much better procedure.

In the early stages it is better to leave the child unhampered by apparatus. It is only in the later stages that it needs support. The question of what shall be done (the application of apparatus or such operations as arthrodesis or neurotization of

muscles) is one for the late stage of the disease, after several years have passed; not in the immediate condition that confronts us in the children of last year's epidemic; and the people who rush in and operate in the early stages will prevent the patients from having the chance of recovery which nature may afford them later.

THE TREATMENT OF SECONDARY ANEMIA IN INFANTS BY BLOOD TRANSFUSION.

In the *Archives of Pediatrics* for June, 1917, KERLEY says the cases included in his report were referred to him because of simple secondary anemia or because of anemia and malnutrition. Various food combinations had been tried, and all had received medical treatment for the anemia. The blood of the donor was proved fit by the absence of agglutination and hemolysis. The technique employed consisted in cleansing and cocainizing the skin over the median basilic vein of the child's arm and exposing about 2 centimeters by dissecting it free from surrounding tissues. A small opening was made into one side of the vein with a pair of scissors and a Lindeman needle inserted. The vein below the needle was then tied, and another suture was placed over the vein and needle to hold the needle in place. A small amount of sterile salt solution was introduced to make sure that there was no leakage. A rubber tourniquet was placed on the arm of the donor, the skin cleansed over the most prominent vein, and the blood drawn with a Record syringe until it was full. This syringe was then handed to the operator working on the child and the blood inserted into the child's vein. At the same time a fresh syringe of blood was being obtained from the donor. Each syringe was well washed out with sterile salt solution before being used again to collect blood. This procedure was continued until the required amount had been transfused.

There were eight cases in the series, and the blood examination before and after the

transfusion showed the effect of the transfusion in each instance. The results in all but one of these cases were satisfactory. One case was transfused twice, and in each instance there was an improvement as shown by the blood examination, but it failed to hold longer than a few weeks. The abdomen in this case was greatly distended, not unlike Hirschsprung's disease. In the other cases there was no return of the anemia, and subsequent growth and development was all that could be hoped for. The children were all under two years of age. Dr. Kerley said he had tabulated the weight increase and the blood findings, but the table could not record the magical change in the patients—the change from sickly, whiny infants into happy, apparently well infants. These patients were transformed from those with a digestive capacity barely able to maintain existence into those that took on the normal constructive processes of early life. [We learn from Dr. Kerley that paraffin was not used for coating the syringe and that pure blood was employed without any anticoagulant. The needles were boiled in albolene.—Ed.]

THE TREATMENT OF SCIATICA BY APPLICATION OF STRONG HYDROCHLORIC ACID.

The *Lancet* of July 14, 1917, recalls that Dr. Harrington Sainsbury described in the *Lancet* of June 16 remarkable results from the treatment of neuritis, and particularly of sciatica, by the application of strong hydrochloric acid to the skin along the line of the inflamed nerve. He describes the treatment to Dr. Hugh Wingfield, but we may point out that it is not new and was noticed nearly twenty years ago in an annotation on an article which was published in *La Semaine Médicale*. We may recall the circumstances, as this valuable remedy seems in the interval to have been almost completely forgotten. Moreover, the manner of its discovery is interesting. This was due to an accident founded on a blundering ignorance of chemistry. A man.

who had suffered for many years from sciatica was treated in an Algerian hospital by hypodermic injections of salt and water, but without much success. After he had left he bethought him that perhaps the salt was not strong enough, and that a stronger preparation of salt might be successful. He therefore procured some "spirit of salt" (strong hydrochloric acid) and painted it on the skin. He got rid of his long-standing trouble in a few days. Shortly afterwards he attended the hospital for some other affection, and confided in Dr. Bourlier, professor of therapeutics, whom he saw, how he had got rid of his sciatica. Dr. Bourlier thought the plan worthy of trial, and employed it in several cases with invariable success.

A thesis was then published on the subject by Dr. C. Gennetas, of Montpellier, on the basis of a dozen cases of sciatica, all of which were completely relieved by this means. As far as we know, only one paper on the subject has been published in this country. After the appearance of the annotation Mr. R. A. Bayliss reported 16 cases of sciatica treated by application of strong hydrochloric acid over the course of the sciatic nerve. In most instances they had defied every other treatment. Two patients were completely cured, 11 were considerably relieved, and three did not improve. He also treated 10 cases of intractable pain in the heels and plantar region, the sequelæ of acute rheumatism, many being gonorrheal. Four of the patients were quite cured, one was very much relieved, and five were not improved.

A COMPARISON OF SEVERAL METHODS OF SPECIFIC EARLY TREATMENT OF ACUTE ANTERIOR POLIOMYELITIS.

After discussing the use of immune serum, adrenalin, and various other measures, ULRICH in the *Boston Medical and Surgical Journal* of July 19, 1917, states that whether or not treatment instituted before the appearance of paralytic symptoms is useful remains to be determined.

Flexner and Lewis were able to prevent the development of poliomyelitis in monkeys if they injected immune serum within twenty-four hours after the animals were infected. Since the incubation period averages eight days, it would seem that the time for effective serum treatment is long past when the first symptoms make their appearance. Furthermore, the mere failure of paralysis to develop after serum treatment can certainly not be adduced to prove the efficacy of this procedure, because many so-called abortive cases never develop paralysis and recover without treatment. It would be necessary to show that untreated cases go on to paralysis in greater numbers than do treated ones.

Zingher reports 54 preparalytic cases treated with immune serum, of which only ten developed paralysis, whereas of twelve untreated cases, seven became paralyzed. Opposed to this is a series of 24 preparalytic cases reported by Place, sixteen of which were left untreated and eight got intraspinal "immune" serum. Three of the treated cases and only one of the untreated ones developed paralysis, showing that the serum treatment was certainly not capable of preventing this complication. Place stated that his series of cases was too small to serve as a basis for definite conclusions, and the same objection may be advanced against Zingher's twelve untreated cases. Zingher himself admits that it is not easy to state "how many of the patients treated with immune serum would have remained free from paralysis without serum treatment," and that the "results and the conclusions from any form of treatment in a disease which is so variable in symptomatology and in prognosis, both as to life and disability, must be given with reserve."

Of the fourteen cases treated in the preparalytic stage by Amoss and Chesney, two developed respiratory paralysis and died, two acquired partial paralysis of certain muscle groups, and ten recovered without paralysis. No controls are cited, so that the series is of little value, particu-

larly in view of the better results observed by Place in his series of untreated pre-paralytics.

In conclusion, Ulrich would say that not only must the various measures employed in this study be looked upon as useless, at least after the onset of paralysis and under the conditions under which the investigation was carried out, but the manipulation of the sufferers necessarily attendant upon lumbar puncture causes great pain, and would seem to be permanently harmful in view of the great need of rest during the early stage of the disease.

A SIMPLE PAINLESS TECHNIQUE FOR SALVARSAN INTRAVENOUS ADMINISTRATION.

MILLER, in the *New York Medical Journal* of October 13, 1917, well says that many physicians are deterred from administering arsenicals in specific disorders because of lack of acquaintance with a sufficiently uncomplicated technique. Salvarsan outfits usually require more than one attendant for successful manipulation, and as most medical men have no efficient assistant, intravenous injections usually demand a trip to the hospital, which may be distasteful to the patient. Most salvarsan outfits are made to be used with large aspirating needles. These are unnecessarily painful, they frighten patients, and do more damage to vein walls than need be. The technique he describes calls for the smallest of hypodermic needles. The twenty-seven gauge is perhaps the best, and under no circumstances should it be larger than the twenty-five. A comparatively short needle is also an advantage, one-half inch being ample length. For administering the solution, the all-glass syringe with ground-glass piston is most convenient. The one he uses has a capacity of 20 Cc. Somewhat larger ones are available for those who desire more dilution of the injection. The water to be used in the injection should be measured in the syringe, then poured into the sterile bottle with the arsenical, and agitated until the solution is absolutely complete. It should then be poured into the

syringe. Before this is done, always attach the needle firmly to the syringe. After the solution has been poured into the syringe, the plunger should be inserted, the needle turned upward, and by pressure upon the plunger all air carefully forced from the syringe.

To make the injection the arm of the patient is exposed well above the elbow. The sleeve should be comparatively free, and no tight band such as a sleeve-holder allowed to remain on the arm constricting the veins. The usual antiseptic precautions of scrubbing the arm with soap and water and then with alcohol should be taken. The patient may be seated in an armchair with the exposed member resting upon the arm

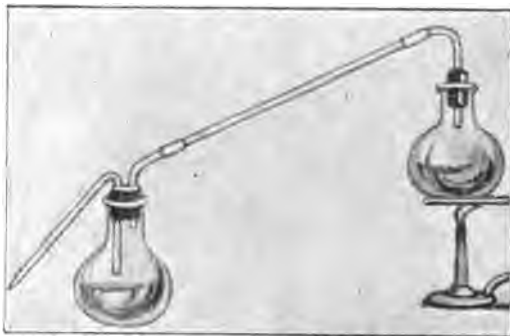


FIG. 1.—Outfit for distilling water. With a simple inexpensive apparatus of this kind the physician need never use water for making intravenous solutions of which he is the least suspicious.

of the chair; the veins are then distended with a tourniquet, which the patient can understand and handle without difficulty. A most effective tourniquet is a clean, medium-sized catheter. Gum tubing long enough to go about the arm one time only and the ends twisted so that the blood flow in the veins is checked is the exact method the writer uses. The patient holds the twisted ends of the tubing and is directed to loosen this without a jerk when told to do so. The operator sits directly in front of the patient or slightly to the side, as is most convenient for holding the syringe so that the needle is on a line with the course of the vein selected for the injection. Usually the largest vein exposed is the best for the injection. The needle should be inserted slowly. If the patient is instructed not to

look, he will seldom feel the point pass through the skin. Sometimes the vein will tend to slip away from the point of the needle. The smaller and sharper the needle, the less this tendency. Sometimes the vein can be steadied by the thumb and finger of the disengaged hand of the operator. When the point of the needle appears to be in the lumen of the vein, the piston should be drawn back slightly. If it is, blood will immediately flow into the syringe. As soon as this occurs, the patient is instructed to loosen the tourniquet. This should be done without a jerk. When the tourniquet is entirely free, a slight backward pull of the

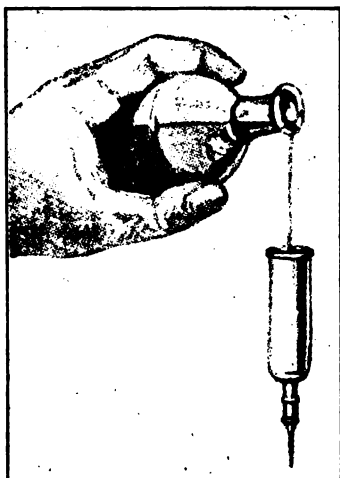


FIG. 2.—When the solution is properly prepared in the sterile bottle it should be poured into the syringe, and the piston inserted. If the process of solution goes on in the syringe the needle will probably become plugged or there will be difficulty in moving the piston owing to fine undissolved particles lodging between the wall of the syringe and the piston.

piston will show a continued flow of blood, indicating that the needle point is still within the vein. The operator now exerts gradual pressure upon the piston, holding the syringe as steadily as possible while so doing. If the patient feels any pain, or moves so that the operator has any doubt whatever as to the needle point being well within the lumen of the vein, the piston should be drawn backward and suction exerted. If the needle point is within the vein, blood will instantly begin to flow into the syringe. This is the most important part of the technique. When in the least doubt in this respect the operator should draw back upon the piston.

Blood should show at once at the point of junction of the needle and the syringe. Pressure can then be made with assurance that the contents of the syringe are flowing



FIG. 3.—Manner of using tourniquet. This can be so placed that the patient can hold it. A single turn of gum tubing should be used, and it should be well above the site of the injection.

into the vein. The drawing back of the piston causing the show of blood can be repeated time and again. It should be repeated whenever the operator is in the least doubt in this respect. If blood does not show immediately when suction is made,



FIG. 4.—With the needle in the lumen of the vein and the tourniquet removed, suction will show whether or not the point is still safely within the cavity of the vein.

the point is outside the vein. The suction should be continued and the point moved until the flow of blood appears in the syringe, indicating that the vein has been entered. In fleshy people with small veins and in women suction can be kept up while the point is searching for the lumen of the

vein. This will be shown by a flow of blood as the lumen of the vein is entered. The utility of backward traction demonstrating the flow of blood when the needle point is safely in the blood stream should never be forgotten. Salvarsan and neosalvarsan cause burning pain if any is injected into the tissues. The patient should be instructed to inform the physician if pain is felt. Blood drawn into the syringe diffuses but little. Being heavier than the solution injected, it sinks to the bottom of the syringe. The attachment of the needle to the syringe usually remains clear, so that the first show of blood is easily seen by the operator when he exerts backward traction upon the piston of the syringe. Salvarsan and neosalvarsan should be injected rather slowly. As the technique is painless the operator is seldom inclined to hurry.

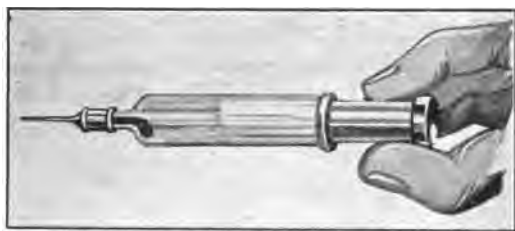


FIG. 5.—Manner in which the blood appears when suction is made and the point is safely within the vein.

Equipped as outlined, the physician with no operative skill should inject these compounds without difficulty.

For dissolving arsenicals, fresh distilled water should be used. The safest way to obtain this is for the physician to make it himself. The illustration shows an outfit which is entirely satisfactory. It can be made up for not over fifty cents. It consists of two flasks which will stand heat. They should be of 500 or 1000 Cc. capacity. They are joined as illustrated with glass tubing and rubber corks. The water is boiled in one flask and condensed in the other. The condensing flask can be set beneath a running tap, or, if this is not convenient, it can be immersed in a bowl of cold water. In a few minutes several ounces of water can be distilled. Miller is in the habit of double distilling all water used in intravenous work.

Simple technique is not alone an advantage to the physician. It encourages patients to submit to these invaluable injections. With the old technique, where the large needles and cumbersome outfits were used, patients have been intimidated, and many who should have several doses of the arsenicals never bring themselves to submit to a second injection.

THE TREATMENT OF INFECTION FOLLOWING LABOR, MATURE AND PREMATURE.

In the *Pennsylvania Medical Journal* for October, 1917, BLAND states that in cases of infection associated with material confined within the cavity of the womb, provided the cervix is open, the treatment should consist in gently removing this substance either with the finger or with placental forceps, but under no circumstances should the removal of the retained contents be followed by any form of irrigation or by curettage. If the cervix is contracted and closed and the material cannot be reached and easily withdrawn, one would mete out justice and help the patient by leaving it absolutely alone, and nature, which is anatomically and physiologically prepared for this function, will more effectively and with a greater degree of safety expel the contents than the surgeon who institutes instrumental interference. In those cases in which there is much odor or discharge, or both, do not be led to believe that this symptom and sign demand treatment. The fact that the patient has profuse discharge indicates that she is expelling the material. An offensive odor is respected. Odor is usually not significant of danger, but it may become so, however, if meddlesome surgery is practiced. Odor may indicate the existence of a concealed spark, and if this is fanned by manipulation or instrumentation, it may cause a conflagration.

The treatment of infection following abortion, whether spontaneous, induced, or criminal, should be along the same conservative lines as outlined for the treatment of infection following labor at term. Prior to two years ago, our routine method of

treating these cases with material retained was to institute immediate surgical measures. Up until that period infected abortions were regarded as surgical emergencies, and emergency surgery was routinely applied to all. The uterus in these cases was dilated and retained material either removed with placenta forceps, a gauze-wrapped finger, a curette, or all of these agencies combined.

We now treat these conditions more respectfully and more expectantly and rarely do we interfere, and this plan is becoming more and more universally adopted. If the material presents through an open os and if it can be readily grasped it should be removed. If the cervix, however, is closed, wait and trust to the powers of nature. In no case is it good surgery to douche and curette.

This question of infection was fully considered by a special committee of the American Medical Association at its meeting in Atlantic City in 1913, and the views expressed by that committee were somewhat along the lines herein described. Since that period the general trend in treatment has been still more along the path of conservatism. At the meeting in 1913, Dr. Polak of Brooklyn referred to one hundred consecutive cases of infection following abortion, sixty-five of which had been curetted one or more times previous to coming under his care, and all of these showed a varying degree of pelvic exudate. He then referred to two hundred cases in which no interference was instituted, and all of these showed, he said, a diminished morbidity and a decreased mortality.

At this meeting Dr. Clarke of New Orleans stated that "when the infection is beyond the endometrium nothing could be more unreasonable than to superficially curette the uterus. If the patient is left alone," he stated, "she will autogenously vaccinate herself and the infection in the majority of cases will resolve." Bland in this paper does not discuss in detail the treatment of localized collections in the pouch of Douglas or in the Fallopian tubes. Suffice to say, however, that we should go slowly in instituting

surgical measures, and still in these cases for a time try methods of conservation. Then, if nature fails, surgical treatment may be resorted to.

Early or hasty surgery in limited puerperal pelvic exudate or puerperal tubal infection is in view of our present knowledge of immunology not indicated, and its general practice means sacrificial and frequently unnecessary operations. The axiom used applies to the operative treatment of pelvic inflammation. "Wait till the temperature reaches normal, then operate," is a wise teaching, but it does not fully cover the premises. At this period nature's therapeutic agencies are just becoming operative. Give them a chance. Wait until the temperature strikes normal, and then still wait, for in so doing one may dodge a dangerous and mutilating operation, and preserve anatomical structures with retentive physiological function.

In concluding Bland reiterates that our whole aim in the treatment of these cases should be directed to economization and conservation of life and tissue, and that these factors are better accomplished by relying on the power inherent in nature than by instituting mischievous and dangerous surgery.

INFANT FEEDING.

To the *Medical Record* of August 4, 1917, REUBEN contributes a paper in which he says that only after a thorough physical examination of the infant has been made and a complete history has been taken are we in a position to prescribe an intelligent formula. Close analysis of the answers received to our questions will enable us to ascribe the malnutrition of the infant to one or more of the following causes:

A. *Formula, Proper*.—(1) The presence of some constitutional disease, such as lues, tuberculosis, pyloric stenosis, cleft palate, congenital heart, exudative or neuropathic diathesis, etc. (2) Too much or too little food (total in the 24 hours). (3) Too much or too little at a feeding. (4) Fed too frequently or too infrequently (too

many or too few feedings in 24 hours). (5) Food improperly prepared. (6) Food improperly administered (too hot or cold; given too fast or too slow). (7) Contaminated or poor milk. (8) Faulty hygiene; lack of fresh air, overheating, lack of proper bathing and clothing, lack of mothering, institutional life.

B. *Formula, Improper.*—(1) Fats too high or too low. (2) Sugars too high or too low. (3) Proteins too high or too low. (4) Salts too high or too low. (5) Water too much or too little. (6) Improper relations of the elements to one another.

In the presence of any constitutional disease a perfect milk formula will not cause proper gain in weight until the underlying constitutional disease has been properly treated. Under these circumstances it would be useless to change the formula every few days, for the infant will not thrive in spite of all changes of food; very often the disease is aggravated by improper feeding; it is therefore doubly important to be sure that the infant has a proper formula, and when convinced of its propriety not to change it too frequently until the underlying disease shows signs of improvement as a result of treatment.

One reason why infants do not gain in weight is because they receive too much or too little food; the percentages may be correct, but the total quantity of food may be too little or too great. Observations on breast-fed infants have shown that a healthy breast-fed infant requires about 100 calories to the kilo in the first three months, 90 in the second, 80 in the third, and 70 from the ninth to the twelfth month; artificially-fed infants require from 10 to 20 calories to the kilo more than breast-fed infants. The smaller the infant, and the less the infant weighs for its age, the greater is the caloric requirement; thus puny and atrophic infants require about 130 to 160 calories to the kilo; all things being equal a quiet infant requires less calories than an active one; the larger the infant is for its age the less is the caloric requirement.

One must always remember that it is not the number of calories introduced, but the

number of calories utilized that are of use to the infant; therefore the mere estimation of the number of calories in the food of an infant with disturbed digestion can serve no useful purpose. Foods yielding the same number of calories will not produce the same gain in weight; of two foods, one rich in fat and low in carbohydrates and salts, and the other low in fat and rich in carbohydrates, salts, and protein, more must be given of the former than of the latter to procure the same gain in weight. From these facts we see that from the mere estimation of the calories in the food we cannot determine whether the infant received too much or too little food; no two infants of the same age require the same number of calories to thrive on; the determining factors are the weight for its age, the size, the degree of activity, the previous state of nutrition, and other factors.

Certain facts we have learned empirically. These are, first, that few infants will gain in weight on less than 35 calories to the pound; second, that very few puny or atrophic infants require more than 75 calories to the pound. It is evident that what is too much for one infant may be too little for another, and *vice versa*; the only proper way of determining the number of calories necessary for any particular infant is to begin with 35 calories to the pound and gradually to increase the number of calories in the food, until the infant begins to gain sufficiently. The only accurate way we have of determining whether the amount of food is too much or too little for any particular infant is therefore clinically; an infant who receives too much food does not finish the bottle, and is not hungry at the next feeding time; it usually regurgitates and the bowels are loose. An infant that is underfed cries immediately after feeding, and long before the next feeding time is due; the bowels are constipated and there is no gain in weight.

The quantity to be given at a feeding depends on the age, the weight, and the state of nutrition of the infant, also on the number of feedings and the length of the intervals. A healthy infant of normal

weight can take: At the end of one month, 3 ounces at a feeding; 2 months, $3\frac{1}{2}$ ounces; 3 months, 4 ounces; 4 months, $4\frac{1}{2}$ ounces; 5 months, 5 ounces; 6 months, 6 ounces; 7 months, 7 ounces; 8 months, $7\frac{1}{2}$ ounces; 9 months, 8 ounces. The amount of 8 ounces at a feeding should not be exceeded under one year of age. The quantity at a feeding to be given to a puny or an atrophic infant depends more on its age than on its weight; both factors must be considered. A good rule to follow in these cases is to give more than the weight and less than the age would indicate; the more an infant is underweight for its age the greater is the water need; thus a baby weighting 7 pounds at two months would get 3 ounces at a feeding; 7 pounds at three months, $3\frac{1}{2}$ ounces; 7 to 8 pounds at four months, 4 ounces; 9 pounds at five months, $4\frac{1}{2}$ ounces; 10 to 12 pounds at six months, 5 ounces. The longer the intervals the more can be given at a feeding, and *vice versa*; infants can often be given more than the anatomical capacity of their stomachs would indicate, because a good portion of the feeding goes directly into the duodenum, immediately after its entrance into the stomach (this explains why puny infants can often take large quantities of fluid without vomiting). At times when too little is given at a feeding the babies cry and fret so much that they vomit the little they get; in these cases to allay the vomiting we must increase the quantity given at a feeding.

No infant should receive more than seven feedings in the twenty-four hours, and should never be fed more frequently than every three hours; when they receive 2 to 3 per cent fat in their milk mixture the intervals should be $3\frac{1}{2}$ hours and the number of feedings six; and when they receive 3 to 4 per cent fat the intervals should be four hours and the number of feedings four to five in twenty-four hours. The fat in the food is the last element of milk to leave the stomach; the higher the percentage of fat in the mixture the longer the intervals must be, otherwise there will be residual food in the stomach at the next feeding. Part of undigested milk leaves the stomach

as soon as it enters it; then the whey (containing the salts and sugar) passes into the duodenum, then the partly digested protein, and finally the fats. It is evident why infants with sugar indigestion usually vomit early, and those with fat indigestion usually some time after feeding (in the latter group of cases the intervals should be made longer).

Very often the infant does not thrive because the milk mixture is not prepared properly; the formula may be correct, but the preparation of it may be faulty. Thus very often when skim milk is ordered the mothers after skimming off the fat usually pour it back into the mixture; and very often when top milk is ordered from two different bottles they use only one. It is important therefore to question the mother as to how she obtains the milk ordered and how she prepares it; also how she measures the sugar, the water, and other elements that may be ordered. All directions for feeding and formula should be written with the care and accuracy of a drug prescription.

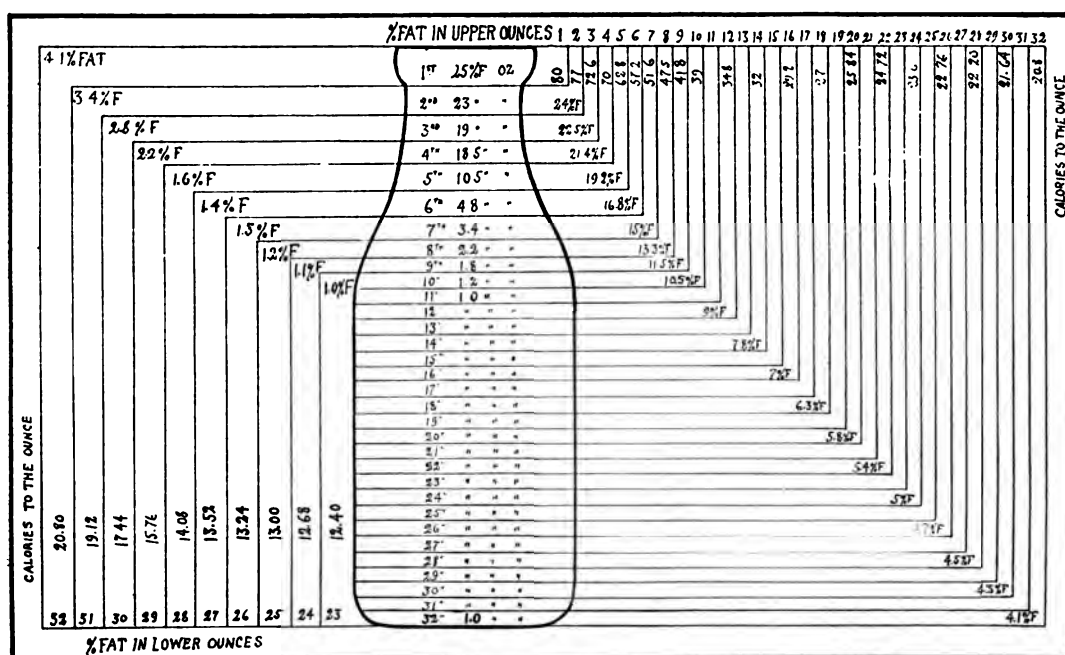
Not infrequently an infant will not gain in weight and have symptoms because the food is given too slowly or too fast; an infant should not take less than ten nor more than fifteen minutes in consuming a feed of 6 ounces; when the bottle is given too slowly the infant often swallows considerable amounts of air, and this causes distention, colic, and vomiting; when food is given too fast it is also apt to be vomited. The infant's stomach is very sensitive to all slight irritations from within and without; therefore all necessary handling and bouncing of infants immediately after feeding should be avoided. If the food is not of the right temperature (about 100° F., tested by pouring on wrist) it will often be rejected by the infant, and if taken will cause vomiting and loose stools. Pacifiers should not be allowed; they are unsanitary, apt to cause infection, and very often lead to swallowing of air with resultant colic and vomiting.

The milk used for infants should be the best obtainable; only grade A bottled milk

should be used; no loose store milk should ever be used on account of the danger of bacterial contamination. When absolutely sure that the milk is clean it can be given raw; in summer-time it is best to pasteurize or bring the milk to a boil; all infants fed with pasteurized or bottle milk should receive fruit juices early and in sufficient quantity to prevent the development of scurvy.

Composition of the Milk.—Milk contains the following elements: Fat, sugar, protein, salts, water, and vitamins. When milk is coagulated and allowed to stand for

drawn and cooled), after four hours' standing, the upper 8 ounces will contain nearly all of the fat that will rise as cream; by varying the number of ounces which we remove from the top of the bottle of such milk, we obtain different kinds of top milk (see diagram). Top milk is therefore milk which is obtained from the top of a bottle which had been bottled soon after the milk was drawn, and allowed to stand in the upright position for at least four hours; depending on how many ounces from the top of the bottle we remove we have different kinds of top milk (5-per-cent milk to



1 level tablespoonful of cane sugar = 60 calories
1 level tablespoonful of milk sugar = 40 calories

1 level tablespoonful of dextrin maltose = 40 calories
1 level tablespoonful of flour = 35 calories

half an hour it separates into a thick mass and a fluid portion. The thick mass or curd consists of the fat and the casein of the milk, and a large part of the insoluble salts ($\text{Ca}, \text{Mg}, \text{P}_2\text{O}_5$); the whey or fluid portion contains most of the water (one quart of milk yields 22 ounces of whey), the sugar, the lactalbumin, and most of the soluble salts ($\text{Na}, \text{K}, \text{Cl}$).

Milk in which the cream and the lower portion are admixed is called a whole or mixed milk; cream is milk which contains a high percentage of fat. When cow's milk is put into bottles (immediately after it is

25-per-cent milk); the figure in each case indicates the percentage of fat in the milk. The layer of cream is not of uniform composition; the greater the number of ounces that are removed from the top the less the percentage of fat in the mixture, and *vice versa*. Top milks which contain more than 16 per cent of fat are usually known as creams. Cream may be obtained by the gravity process or by means of the centrifugal machine (separator); gravity cream contains from 16 to 20 per cent fat; rich centrifugal cream contains 30 to 40 per cent fat.

When top milk is removed the remainder is skim milk; the greater the number of ounces of top milk that are removed the less the percentage of fat in the skim milk; by varying the number of ounces removed from the top we can obtain skim milk which contains 3 per cent fat, 2 per cent fat, or 1 per cent fat. As all the fat that rises as cream does so in the top 8 ounces, the percentage of fat in the remainder of the milk (lower 24 ounces) is of uniform composition (1 per cent fat); it is thus not possible to obtain a skimmed milk of less than 1 per cent fat by the gravity method. When a fat-free milk is desired the fat must be removed by a centrifuge or separator.

The proteins, sugars, and salts in top milks, whole milk, and skim milk are approximately the same (proteins 3.5 per cent, sugar 4.5 per cent, salts 0.75 per cent); slightly less in top milks, except in very rich creams, where they are reduced to two-thirds of the original quantities (see diagram).

From extensive studies conducted for the last ten years Reuben has come to the conclusion that the great majority of healthy infants thrive better, develop better, and undergo a less morbidity and mortality when dilutions of whole milk are used than from the use of dilutions of top milk. Infants who suffer from fat intolerance should be put on formulas derived from skim milk; those with sugar intolerance, on top-milk mixtures or eiweiss (protein) milk; infants who are very much under weight and do not present any intestinal symptoms should be put on skim milk with a high percentage of carbohydrates, because such a mixture contains a low percentage of fat, an element which is the hardest to digest and is most apt to cause indigestion, and one which consumes the largest number of calories in its digestion; a high percentage of protein, an element which seldom causes any indigestion; a high percentage of carbohydrates, an element which is the most readily assimilated and with least expenditure of energy; and a high percentage of salts, which is conducive to a

retention of water, as these infants are dehydrated.

About 90 per cent of all infants do well on whole milk dilutions, in about 7 per cent it will be necessary to use skim-milk mixtures, and in about 3 per cent top-milk mixtures. Intolerance for milk as a whole or for any of its elements is the least common cause of malnutrition; for every case of malnutrition due to intolerance there are nine due to over- or underfeeding, irregular feeding, improper technique or method of preparation. Of the intolerances, that for fat is most frequent (70 per cent), for sugar less frequent (20 per cent), and for protein least frequent (10 per cent).

WHAT WE KNOW TO-DAY ABOUT THE PHYSIOLOGY OF THE TONSIL.

To the *Virginia Medical Semi-Monthly* of July 13, 1917, Kuyk contributes an article on this topic and comes to these conclusions:

1. The tonsil serves as an absolutely necessary factor in providing a channel for the action of the palatoglossus muscle.

2. The function of the tonsil with reference to the palatopharyngeus is to afford support and protection—of great importance to its normality of action.

3. Tonsillectomy serves to destroy not merely a possible lymphatic function of the tonsil, but also to disturb or destroy an important physicommechanical function, one which is capable of being clearly understood.

4. More or less impairment of action of the depressor must occur in practically all cases of tonsillectomy, regardless of the delicacy of the operative technique, or the particular form of operative procedure adopted; but delicacy of procedure and method of operation are not, of course, to be considered unimportant.

5. To consider the present operation of tonsillectomy as a final settlement of the operative approach to the tonsil is premature and erroneous. The whole tonsil question requires further anatomical, pathological, and operative study, in order, if possible, to readjust the operative approach

to the organ to the new knowledge which is accumulating.

Combining, then, the three known functions of the tonsil, it is seen that it subserves a threefold function possessed by no other organ in the body. For this reason it should receive the greatest consideration, and due study should be given each case upon its own merits, especially in childhood, before a definite treatment, especially its removal, is undertaken. For this reason experienced school inspectors should be employed. It should be remembered that a tonsil becomes enlarged by systemic disturbances as well as local irritation or inflammation, and that under appropriate medical treatment it will return to its original condition.

This is a synopsis of a larger paper consisting of abstracts, quotations, and references.

Kuyk expresses the hope he has given enough to convince one that the tonsil question is by no means settled, rather that it is yet in the making, and that until we have acquired definite knowledge we should study each case of enlargement of the tonsil upon its own merits, treating it accordingly, rather than upon some preconceived impression.

BRONCHIAL ASTHMA.

In the *Medical Record* of August 4, 1917, MORRIS gives this summary of the best remedies for asthma:

To relieve a paroxysm, each of the following agents is useful: (1) Nitroglycerin, gr. 1/100; (2) adrenalin chloride (1:1000 sol.), gtts. 10-15 subcutaneously; (3) atropine, gr. 1/100 hypodermically; (4) morphine, gr. 1/4 by hypo; (5) hyoscine, gr. 1/200; and atropine, gr. 1/100. In old people especially, nitroglycerin should be given with adrenalin, to control the blood-pressure. Morphine is probably the most efficacious drug, but it should be given only when other remedies are not available, 1/4 grain usually being sufficient; however, a dose of two grains was often necessary to relieve a very stubborn case under the care

of the author. A mixture of morphine, nitroglycerin, and adrenalin seems to be more effective than either one used singly. Also inhalations of chloroform, ether, and amyl nitrite are very good. Oxygen is also used by inhalation. The fumes of burning stramonium and nitre paper are good. The patient may smoke stramonium cigarettes. In papaverine, an opium alkaloid of the isoquinoline group, an excellent drug for the treatment of asthma is at hand, because it distinctly stimulates respiration and dilates the bronchi, and has efficiently relieved asthma of the bronchial type.

AN ANALYSIS OF CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS.

In the *Lancet* of June 30, 1917, BRUCE reminds us that in his two previous analyses it was stated "the main conclusion to be drawn from a study of these cases of tetanus treated therapeutically by antitetanic serum is that it seems highly probable that the serum has little or no effect on the course of the disease." This, of course, must be understood to be merely an opinion formed from the study of these particular figures. It is not the expression of an opinion as to the usefulness or not of antitetanic serum as a therapeutic agent. It merely means that no evidence can be gained from these reports in favor of the curative power of this antitoxin. This is not to be wondered at. The number of cases analyzed is small. There are only two controls. The greatest variety in mode of treatment existed. The men were suffering from wounds, septic poisoning, and other diseases in addition to tetanus. The cause of death is credited to tetanus, but in many cases wrongly so. For example, among the 73 deaths in the 200 cases under consideration, 14 at least were primarily due to gas gangrene, septicemia, heart failure, or pneumonia. Under these circumstances it is not surprising that no conclusive evidence can be gained. The difficulty of arriving at truth in human therapeutics is notorious. It would certainly be very satis-

factory, and ample reward for work expended, if the real value of antitetanic serum in the treatment of tetanus could be definitely laid down.

Millions of cubic centimeters of antitetanic serum have been used since the war began. If it could be proved to be of no use it would mean a great lessening of pain and inconvenience to the men suffering from tetanus, and economy to the State.

If it were possible and legitimate to stop all treatment of tetanus in the army by antitetanic serum for six months or a year some valuable information might doubtless be obtained. But this is not practicable, since the consensus of opinion of medical officers in England is decidedly in favor of this specific treatment. The only thing to do, then, is to redouble the efforts to make the therapeutic application of the serum as thorough as possible. This can best be done, according to the Tetanus Committee, by the recognition of early symptoms and the thorough application of the antitoxin without any loss of time by the intrathecal route.

It must be clearly understood that these remarks only refer to the therapeutic or curative use of antitoxin. The enormous value of antitetanic serum as a prophylactic is firmly established beyond any shadow of doubt. It is to be sincerely hoped that there will be no slackening in its use as a prophylactic, and the medical officers in charge of wounded in home hospitals will give the recommendations of the Tetanus Committee in regard to the repetition of these prophylactic doses a thorough trial.

1. *Carbolic Acid Injections*.—During August, September, and October, 1916, there were only two cases treated with this drug; one recovered, one died. Case 410 is reported to have had 10 minims of a 2-per-cent solution, but how often or how long is not stated. Case 444, 2 Cc. of a 4-per-cent solution every two hours for three days. Died.

2. *Magnesium Sulphate*.—Only one case was treated. Case 485. Intrathecal injections of 40 minims of 25-per-cent solution daily under nitrous oxide anesthesia. Died.

1. In the 200 cases of tetanus under review the mortality was 36.5 per cent.

2. The greatest number of cases occurred between the ninth and fourteenth days.

3. Only three cases are reported to have received secondary prophylactic injections of antitetanic serum in home hospitals.

4. In regard to the therapeutic effects of the serum the evidence as collected from the August, September, and October, 1916, reports is not conclusive.

5. The summary given in the last analysis in regard to treatment may be repeated.

(a) Place in a quiet, darkened room under the care of a capable and sympathetic nurse. "Rest, sleep, and food" are looked upon as the first essentials of treatment.

(b) If thorough surgical treatment is carried out on wounds from the beginning so as not to allow the presence of necrotic tissues or foreign bodies, the number of cases of tetanus should sensibly diminish, if not altogether disappear. But if a case does occur, then the wound should not be actively interfered with until the tetanic symptoms have subsided.

(c) The intrathecal injection of large doses of antitoxin, of high potency if available, should be begun at once and supplemented by intramuscular and subcutaneous injections.

(d) In addition, if necessary, the patient should receive sedatives, of which morphia in $\frac{1}{4}$ -grain doses and administered every four hours is perhaps the most suitable. Chloral, chloretone, and other sedatives may also be given by the mouth or rectum.

THE EFFECT OF VACCINIA ON THE WELL-BEING OF CHILDREN.

KINLOCH, in the *Lancet* of June 30, 1917, tells us that his figures deal with 3804 cases of infectious diseases, of which 3058 were vaccinated and 746 unvaccinated, and they show repeatedly an increase in the incidence of disease complications and death among the unvaccinated. A larger number of cases will have to be examined before this point can be regarded as generally proved.

It is not contended that vaccinia increases

the resistance of the body to disease in general. The results obtained in this inquiry must depend in part on the inclusion among the unvaccinated of weakly children exempted from vaccination on purely medical grounds, and this inclusion may be sufficient to explain the increased vulnerability of the unvaccinated group.

Whatever be the explanation of the figures submitted, the fact remains that they afford no evidence that vaccinia has a prejudicial effect on a child's future well-being as judged by its response to subsequent infection.

PERSONAL EXPERIENCE WITH THE EXTRACT OF CORPUS LUTEUM.

HAPPEL, in the *Interstate Medical Journal* for July, 1917, expresses his belief that the extract of corpus luteum is the most effective remedy for menstrual irregularity in young women and for the relief of nervous symptoms which usually accompany it. It is a specific in certain cases of headache and should be tried when the ordinary remedies fail. It prevents the development of the symptoms of postoperative menopause and relieves those of the natural climacteric. It is useful in the treatment of sterility and sexual anesthesia and should be tried in hyperemesis gravidarum. Certain cases of dysmenorrhea are cured by it.

THE DEBT OF MEDICINE TO THE DISCOVERY OF DYES.

The *Lancet* of July 17, 1917, calls attention to a series of articles on "Science and Industry," published in a supplement to a recent issue of the *Manchester Guardian*. There is one by Dr. C. W. Saleeby on "Dye-stuffs and Medicine," in which the remarkable influence on the progress of medical science, encouraged by the discovery of coal-tar dyes, is discussed. The subject is not in the least new to medical and scientific audiences, but it is none the less interesting. As we have often pointed out, the selective action of dyes on microorganisms was a step of the utmost diagnostic value by add-

ing to the efficiency of microscopic examinations, and now we are turning this selective action to account in the treatment of numerous infections. The dyes, in short, have laid the foundations of a system of chemico-therapeutics which promises to be of distinct importance in combating some of the worst human ills. The discovery of a dye substance—*e.g.*, such as acriflavine—which appears to discriminate between friend and foe, only attacking the latter, suggests the possibility of finding further selective substances which are not inimical to the human organism, but destructive to the particular disease organisms which are known to have invaded the host. The possibility of successful treatment on these lines is real. Little could William Murdoch have conceived in 1792 when he distilled coal for the first time for producing gas for lighting his house—thus laying the foundations of the coal-gas industry—what great potentialities lay hidden in the distillation whose by-products now yield such an astonishing stock of valuable synthetics, antiseptics, dyes, and explosives.

THE LOUSE PROBLEM.

In the *Proceedings of the Royal Society of Medicine* for April, 1917, BACOT writes exhaustingly upon this important army problem. His conclusions are as follows:

Heat.—Dry air or water at a temperature of 52° C. will destroy both active lice and nits within a period of thirty minutes. Higher temperatures kill more quickly; water at 100° C. kills the nits in half a minute. In the destruction of lice by heat the all-important factor is penetration. Thick or folded garments require longer time than hung or spread ones. Bundled clothing is only slowly penetrated. Other factors being equal, dry heat is more economical than wet, because wet garments require drying after treatment.

Cold.—Exposure to cold, 30° to 38° F. or —1.1° to 3.3° C., for two days is fatal to active lice, although they may be living at the end of the period. If continued for four

days they are killed within the period. Nits survive exposure to the same temperature for seven days, but not eleven.

Insecticides: Contact.—To keep continuously worn garments free from lice the best method is to impregnate with cresol or crude carbolic acid, employed in soap emulsified form, dipping the garments in a solution containing from $2\frac{1}{2}$ to 5 per cent, according to the climate or season; hot weather needs less, cold more.

Vapor.—Insecticides which act by vapor have a very restricted range—not above 1 inch, or at the outside 2 inches. Naphthalene is probably the most economical and effective of the quick remedies, but at body temperature it rapidly evaporates. If underclothing is impregnated to the extent of 2 mgrm. per square centimeter—10 mgrm. per square inch, or about 16 grm. per shirt—its lethal effect will have entirely passed away within five hours. If used in packets its range of action will be less than 2 inches. Used as powder it is wasteful, owing to its dusting out of clothing; mixed with soft soap or grease this waste is prevented and its efficiency is increased. Crude naphthalene is cheaper and more effective than pure. Sassafras and other essential oils are very effective, but kill by contact, not vapor, under the conditions of use. Smell is no guide to vapor effect.

Paraffin Oil.—Immersion for five minutes kills the greater proportion but not all of the nits.

Sassafras Oil.—Immersion for five minutes kills all of the nits. A 10-per-cent watery solution of this oil in emulsion formed with soft soap is also effective as against nits. (One part soft soap melted in five parts of water by heat, twenty parts of the oil added very gradually with thorough shaking or stirring.)

Crude Carbolic Soft Soap Emulsion.—Immersion in a 5-per-cent solution for five minutes kills all nits.

Tar Oil Soft Soap Emulsion.—Immersion in a five-per-cent solution for five minutes kills all nits.

Potato-paring Infusion.—Recommended by a writer in the *American Journal of*

Clinical Medicine. Immersion for thirty minutes was quite ineffective, and did not even kill active lice.

Quassia Chips.—An infusion of 20 grm. in 250 Cc. of water boiled for over an hour was tried; immersion for ten minutes was quite ineffective, and the active lice lived for two days afterwards, but failed to feed.

Chlorine Gas.—Nits exposed to the action of this gas during the course of trial at the Royal Army Medical College hatched in the normal course and adults were reared from them.

Colorado Vermin Killer.—Carbon disulphide, 10 Cc.; crude carbolic, 91 Cc.; oil of tar, 2.5 Cc.; kerosene, 435 Cc.; killed all nits immersed for five minutes.

Of these remedies tar oil emulsion and a 5-per-cent solution of crude carbolic soap emulsion might be used for the treatment of heads, as they are more effective than paraffin oil and cheaper than sassafras oil.

For the treatment of nits in the seams of clothing either of these or the Colorado vermin killer would be effective; the latter would, of course, be too irritating for use where it comes into direct contact with the skin.

BLOOD TRANSFUSION, WITH SPECIAL REFERENCE TO THE CITRATE METHOD OF LEWISOHN.

HEYD in the *New York Medical Journal* of July 14, 1917, expresses the belief that in the replacement of blood following an acute hemorrhage the dangers of hemolysis or agglutination appear to be almost negligible. In these cases as in all others Heyd prefers to be protected by a laboratory report. If, however, it were necessary to do a transfusion without the aid of tests he would have no hesitation in doing so. Having assured himself that the patient was free from syphilis and under the circumstances preferably one of the family, he would give the transfusion, for it has been observed almost without exception that upon the attempted transfusion if the bloods are grossly incompatible there will be well-defined symptoms of hemolysis which occur sufficiently early to stop the

transfusion before irreparable damage is done.

In the anemias secondary to chronic infection or low-grade septicemia the selection of the donor is of great importance. In these conditions a series of transfusions is required, and not one isolated massive transfusion. Where Heyd has obtained a positive blood culture and has isolated the particular infective agent, and having obtained a donor who for a regular stipend places himself unreservedly in his hands, he immunizes the donor for this particular form of bacteria. It is too early to determine whether this has had a very marked effect. Heyd's own impression is that it has not been a material factor. The element of value in these serial transfusions seems to be the biotic properties of fresh pure blood acting upon a patient whose resistance has been undermined by long-continued sepsis. After a consideration of these factors the question to be determined is what method of transfusion will give the best result. If one analyzes the various conditions that enter into a successful transfusion he will find that there are roughly four: (1) It shall be accomplished with absolute asepsis. (2) It shall deliver blood unchanged. (3) It shall deliver a known quantity of blood. (4) It shall be simple and easy of application. A short survey of the subject of transfusion proves conclusively that the technical transfer of blood has long been far in advance of our knowledge of the inherent chemistry of the blood.

By any of the accepted methods it is comparatively easy to transfer blood from a donor to a recipient, but just what that blood will accomplish and just what condition will be induced by the transfer of blood remain unanswered. The syringe method or its modification requires a high degree of coördinated team work, and therefore it is inapplicable to cases in which transfusion must be done rapidly and with the assistance possibly of a nurse or one other person. With that end in view Heyd has come to the conclusion that the citrate method elaborated by Weil, Huston, and

Lewisohn is best adapted to the use of the ordinary practitioner of medicine.

The citrate transfusion method is based upon the use of sodium citrate as an anticoagulant, and in practice we have a standard solution made up of distilled water 500, sodium citrate 10. Lewisohn has proved that the proportion of 10 Cc. of this standard solution for every Cc. of blood transfused will prevent clotting for two or three days or even longer. For convenience Heyd has the sodium citrate put in ampoules of 50 Cc. of a two-per-cent solution, and a 50-Cc. ampoule is sufficient for 500 Cc. of blood. Although sodium citrate retards coagulation if used in the strength of 0.2 per cent, Weil has demonstrated that during the first twenty-four hours after a citrate transfusion the coagulation time is lessened to nearly one-half, and at the end of twenty-four hours the coagulation becomes that of the blood previous to transfusion. Apparently in hemophilia a citrate transfusion with its diminution of the recipient's coagulation time would seem better indicated than the transfusion of blood with an ordinary coagulation time. The citrate method can be carried out with absolute asepsis, the quantity of blood given is actually measured, and the technique is easy and simple. It does not, however, answer our condition of giving an unaltered blood. The effect of sodium citrate upon the organism in doses given with an ordinary transfusion of 500 to 1000 Cc. exerts practically no effect upon the organism except the development of a polyuria. This is a rather frequent concomitant of the citrate method. So far as changing the blood is concerned it apparently makes no difference. It hastens the coagulation time for the first twenty-four hours, and then does not retard the coagulation time beyond the previous normal time limit. Therefore Heyd has become more and more convinced of the essential merits of the citrate method. Lately he has completed twenty-five consecutive transfusions by the citrate method with no bad results.

A distinct advantage of the citrate method is the fact that close contact between the donor and the recipient is

unnecessary; this is of particular value in the case of a patient who is very nearly dying from anemia or exhaustion. The accomplishment of the syringe transfusion causes a high degree of psychical disturbance and is associated with considerable reaction upon the part of the patient.

On one occasion Heyd withdrew 700 Cc. of blood for a citrate transfusion and immediately gave 350 Cc. Two days later the remaining 350 Cc. were given without ill effects. At another time he withdrew 500 Cc. of blood for a citrate transfusion and gave 350 Cc. to one patient and 150 Cc. to another patient. The interval between the two transfusions was forty-eight hours. The citrated blood was kept in a refrigerator during the interval and showed, microscopically and macroscopically, no changes. Previous to the introduction in the second patient it is heated to body temperature by immersion in a container in a basin of hot water. Kalaski has withdrawn blood for citrate transfusion and then carried it to a recipient in another part of the city.

The citrate method is technically easy to perform. Repeatedly Heyd has bled the donor in the operating-room and given the infusion in the ward or private rooms. The subjective disturbances have certainly been less than with the manipulation incident to any of the syringe methods.

CANCER DECALOGUE.

The *Boston Medical and Surgical Journal* of July 12, 1917, prints a cancer decalogue prepared by the standing committee on the control of cancer of the Massachusetts Medical Society.

1. The classical signs of cancer are the signs of its incurable stages. Do not wait for the classical signs.

2. Early cancer causes no pain. Its symptoms are not distinctive, but should arouse suspicion. Confirm or overthrow this suspicion immediately by a thorough examination and, if necessary, by operation. The advice "Do not trouble that lump unless it troubles you" has cost countless lives.

3. There is no sharp line between the benign and the malignant. Many benign new growths become malignant and should, therefore, be removed without delay. All specimens should be examined microscopically to confirm the clinical diagnosis.

4. Precancerous stage. Chronic irritation is a source of cancer. The site and the cause of any chronic irritation should be removed. All erosions, ulcerations, and indurations of a chronic character should be *excised*. They are likely to become cancer.

5. Early cancer is usually curable by radical operation. The early operation is the effective one. Do not perform less radical operations on favorable cases than you do on unfavorable ones. The chances for a permanent cure are proportionate to the extent of the first operation. Make wide dissections; incision into cancer tissue in the wound defeats the object of the operation and leads to certain local recurrences.

6. Late cancer is incurable, though not always unrelievable. Radium, *x*-rays, ligation, cautery, or palliative operations may change distress to comfort and may even prolong life.

7. Cancer of the breast. All chronic lumps in the breast should be removed without delay. Benign tumors can be removed without mutilation. Examine all specimens microscopically. An *immediate* microscopical examination is desirable, since if positive it permits a radical operation at the same sitting. A radical operation performed ten days after an exploratory is almost never successful in curing cancer of the breast.

8. Cancer of the uterus. Any irregular flowing demands thorough investigation. Offensive or even very slight serous flows are especially suspicious. Curette and examine microscopically. Amputate all eroded cervixes which do not yield promptly to treatment. Do not wait for a positive diagnosis.

9. Cancer of the digestive system is difficult of early diagnosis, and therefore unfavorable in prognosis. All persistent and

recurring indigestions (more especially if attended by change of color and loss of weight) and any bleeding or offensive discharges demand prompt and thorough investigation. Do not wait for a positive diagnosis.

10. Cancer of the skin. Any warts, moles, or birthmarks which enlarge, change color, or become irritated should be removed promptly. They are likely to become cancer. Do not wait for a positive diagnosis.

THE PRINCIPLES OF THE TRANSFUSION OF BLOOD.

In concluding an article on this topic in the *Proceedings of the Royal Society of Medicine* for March, 1917, STANSFELD summarizes his views as follows:

1. Transfusion has been successfully employed in the treatment of various kinds of anemia and in the arrest of spontaneous hemorrhage. It has also yielded promising results in cases of serious infections and in certain toxemias.

2. The ultimate prognosis in cases of anemia depends upon the power of reaction in the bone-marrow, and this can only be adequately determined by observing the results of treatment.

3. In cases of pernicious anemia both increased red cell production and diminished red cell destruction may result from transfusion.

4. In cases of pernicious anemia the age of the patient, the duration of the disease, and the condition of the bone-marrow as indicated in the peripheral blood, have hitherto proved to be the best guides to the progress subsequent to transfusion.

5. The optimum dosage for transfusion is not yet determined, but it is probable that moderate repeated doses are preferable to large single doses in the treatment of chronic anemias. Very small doses may sometimes be of value.

6. The donor should be a healthy adult with negative Wassermann reaction. The serum of the donor should not agglutinate the corpuscles of the patient, and the serum

of the patient should not agglutinate the corpuscles of the donor. Agglutinins should be excluded by tests done immediately before the transfusion, and a single examination is not sufficient to establish the compatibility of two bloods on all future occasions. If agglutinins are absent, hemolysins will also be absent.

7. If there be great urgency, and testing of the blood of patient and donor be impracticable, a small preliminary transfusion should be done half an hour before the main mass of blood is transfused so that gross incompatibility may be recognized in time.

Febrile reactions occur after about 25 per cent of transfusions, even though the bloods of donor and patient have been proved to be "compatible." Rigors occur in about 10 per cent of the cases.

9. It may prove desirable to investigate the bloods of donor and patient with regard to factors of which we as yet know nothing, not merely for the sake of avoiding accidents, but also to determine whether a given donor is likely to afford the maximum of benefit in a particular case.

10. The indirect method of transfusion, employing a glass receiver and sufficient sodium citrate to prevent coagulation of the transfused blood, is simple and involves no special danger.

SOME NOTES ON ARTIFICIAL PNEUMOTHORAX.

RINGER in the *Boston Medical and Surgical Journal* of July 12, 1917, wishes in the course of a practical article to say a word or two as to his own opinion on the question of artificial pneumothorax. He thinks he may characterize himself as a conservative enthusiast with regard to artificial pneumothorax, save in those cases in which gas is administered for the control of hemorrhage, when he becomes an unreserved enthusiast. He knows of no result in tuberculothoraxy more brilliant than the change wrought by the successful induction of pneumothorax. The return to health and the subsidence of symptoms are some-

times so rapid as to be almost uncanny. But again there is the other side of the picture. We see few bluer and more despondent patients than those upon whom pneumothorax has been tried without success. They feel that the last straw has snapped, and, alas! in the vast majority of cases they are right. The method is usually tried on advanced cases or in those in which there is going on a rapid dissemination from a relatively primary focus. If collapse fails, we are left face to face with prolonged bed-rest, etc., all of which has probably already been resorted to before pneumothorax was attempted. Again, there are no sadder pictures than are presented by those unfortunates in whom pneumothorax has worked wonders and in whom these wonders fade away before our eyes with the awakening to activity of a previously quiescent focus in the good side. We take out the gas—the focus may quiet down—but the last condition is never as good as the first, and more often the patient goes steadily down-hill. Judgment and more judgment is needed in the selection of cases. But few there are that will be wholly unilateral. Then the question presents itself, will the relatively sound lung hold? Some we know will not—that settles it—but the border-line case is hard indeed to decide. Experience, small injections, and frequent repeated stethoscopic examinations of the sound side are necessary to reach a satisfactory conclusion.

While the preceding paragraph may sound skeptical and possibly pessimistic, it is not the intention of the writer to convey that impression, but merely to stress the point that, despite the wonders wrought in certain cases by the use of this method, the way is fraught with danger and many a time failure will be our lot. He does feel, however, that the induction of artificial pneumothorax in the treatment of pulmonary tuberculosis is a procedure that should be at the command of every man dealing largely in pulmonary affections. In an analysis of thirty cases of his own recently reported before the North Carolina Medical Association, the writer was

able to report success in 23 per cent, and adding thereto three successful injections for hemorrhage, a total of 33 per cent was attained. Surely this is enough, and far less than this should be enough, to warrant the use of the method which is, as far as he knows, the only procedure at our command by which we can offer, to a certain number of advanced cases, a one-in-three chance of a return to health and working efficiency.

PHARMACOLOGICAL STUDIES OF THE IPECAC ALKALOIDS AND SOME SYNTHETIC DERIVATIVES OF CEPHAELINE.

In the *Journal of Pharmacology and Experimental Therapeutics* for July, 1917, WALTERS and KOCH in concluding a paper on this topic state that the substitution of the methyl group in emetine by radicals of the higher homologous alcohols markedly decreases the toxicity. Cephaeline iso-amyl ether is the least toxic of the series examined, being only one-fifth as toxic as emetine when given subcutaneously.

Emetine is not a very toxic alkaloid when given in a single dose, but is dangerous when given repeatedly in small doses over a considerable period of time.

RESULTS OF DEEP ROENTGEN-RAY TREATMENT IN 250 CASES OF MALIGNANT TUMORS.

HOLDING in the *American Journal of the Medical Sciences* for July, 1917, states that from a study of his cases he is justified in drawing the following conclusions in regard to the value of Roentgen rays in cancer:

1. Roentgen rays give excellent therapeutic results in basal-cell epithelioma.
2. They ameliorate cases of carcinoma of the breast, ovary, and testis, and tumors of lymphatic structures, especially when these tumors are made up of cells of an embryonal type.
3. While he cannot successfully maintain that the Roentgen rays have yet proved to be a cure in cancer, it is worthy of note that these rays as well as those of radium

applied, with removal when possible, produce more uniform improvements in cancer than any other agents heretofore known, and the use of these agents in cancer is established until some effectual constitutional treatment for cancer is found.

4. Pending the discovery of some effectual constitutional treatment every effort should be made to increase the ameliorating effects of the radioactive methods.

5. Surgery should not ignore the benefits of these methods in the treatment of cancer, particularly in the postoperative raying and treatment against metastases.

6. Most of the improved cases eventually relapse, and while their lives are prolonged and made more comfortable by the Roentgen-ray treatment they eventually die of the disease.

7. In some instances these ameliorating effects were very striking and deserve particular attention in the hope that we may eventually discover means of making these ameliorations more lasting and even permanent.

AURICULAR FIBRILLATION.

LEVINE in the *American Journal of the Medical Sciences* for July, 1917, very properly states that it is well understood by all clinicians that in the treatment of heart disease one should not interest himself in treating an irregularity. The most important aim is to help the heart muscle. In this connection auricular fibrillation plays a very important rôle, for the irregularity results essentially in a rapid ventricular rate if the condition is left untreated. This rapid rate tires out the heart, and although the patient at first may have no complaints and show no symptoms of circulatory failure, the heart muscle is using up its reserve. The cases which show the transient form of fibrillation do not generally need any treatment, except as is indicated by other manifestations, and in pneumonia, when the picture becomes most alarming. Those who have persistent auricular fibrillation should be given digitalis to reduce the rapid heart action. There is no better drug for this

purpose than digitalis, or strophanthin when more immediate action is desired.

The various means of treating heart failure were employed in Levine's cases. All patients were put to bed, using back-rests and pillows to aid breathing if necessary. If edema was present they were given the Karrel diet, consisting of 800 Cc. of milk a day, with no additional water until the edema was gone or was appreciably reduced. Mechanical removal of fluids from the body cavities was seldom necessary. One measure that is probably not sufficiently used in severe forms of heart failure is bleeding. It was customary with these patients to bleed all who showed evidence of extreme failure of the right side of the heart—i.e., marked cyanosis, pulmonary congestion, enlarged tender pulsating liver, edema, ascites, and dilatation of the right side of the heart. Frequently, with most gratifying results, 400 Cc. to 800 Cc. were removed from the median basilic vein, the relief being immediate. This would help considerably in the course of the treatment before the other measures could begin to show their effect. Although most patients were immediately given digitalis in some form, those whose state was not quite so urgent were sometimes allowed to go without medication for the first twelve or twenty-four hours to observe the change brought about by rest in bed. There was no fixed dose of digitalis used, but in general the patient received one gramme of the powdered leaves during the first two or three days, depending on the severity of the condition. Digitalis was continued in 0.1-gramme doses three times a day until a therapeutic or toxic effect was produced. In the most urgent cases strophanthin (0.0003 to 0.0005 gramme doses) was given intravenously, but always only when it was certain that no digitalis had been previously given. Another helpful drug in many of the cases was theocin. Its beneficial effects as a diuretic have recently been reviewed by Christian. He showed that the best results were obtained by theocin in the cardiac cases with edema which had a good kidney function, and that if given after a course

of digitalis it was especially efficient as a diuretic. In all cases particular attention was paid to procuring comfortable rest during the night.

It might hardly seem necessary to emphasize the importance of following the apex-rate in conjunction with the rate of the radial pulse in cases of auricular fibrillation. But this practice is by no means general. These two counts frequently show a marked discrepancy at first, and as the condition of the patient improves the two rates tend to coincide. In fact, it frequently happened that as the patient was improving and the apex-rate was falling the radial rate was increasing—i.e., there were more beats strong enough to reach the wrist with fewer impulses arising in the ventricles. A slow radial pulse is of no significance, for it may indicate either that only a portion of the many beats are strong enough to reach the radial artery or that the heart-rate is actually slow. A slow apex-rate is always significant. In most of the cases reviewed here the heart-rate responded quite readily to the above treatment, and hand in hand there resulted an improvement in the clinical condition. There were several in whom the heart-rate was slowed without any accompanying improvement in the symptoms, and in a few neither the rate nor the clinical picture was affected.

DYSENTERY.

In the *Quarterly Journal of Medicine* for April, 1916, BARTLETT discusses the pathology of dysentery in the Mediterranean Force in 1915, and has this to say as to treatment:

The routine treatment of all cases of dysentery was that recommended by Sir Ronald Ross. It may be summarized as injections of emetine hydrochloride, administration of saline purgatives and bismuth mixture, rest in bed, and careful diet.

The effects of this treatment, as gauged by an examination of the feces and the associated clinical signs and symptoms in thirty selected cases, were as follows: In the great majority of the cases the amebæ

and "refractile cells" disappeared in about six days; the stool remained purulent for a variable time after the disappearance of the protozoa. In a few cases a thorough course of treatment failed to eliminate the amebæ and refractile cells.

Analysis of the cases in the post-mortem room confirmed and amplified these findings. The success of the treatment in eliminating amebiasis was well illustrated by one group. In this group, when compared with another group, the routine treatment had been on the average much more thorough, amebæ were not found in the tissues, and in five out of twenty-one cases the amebic lesions were healing or healed. The occasional failure of the treatment is illustrated by some of the cases. In one case the treatment had been as thorough as in any group, but numerous amebæ were present in all the ulcers examined. In three cases in which between five and ten grains of emetine had been administered numerous amebæ were found in the ulcers. One group further explained the persistence of purulent diarrhea after the disappearance of amebæ from the stools. In this group the relative preponderance of cases showing the severer forms of secondary bacterial inflammation was conspicuous. In thirteen cases severe inflammation of the ulcerated colon was present, and was the cause of death. In these a purulent diarrhea persisted until death.

It is clear, therefore, that treatment in amebic dysentery must be designed not only to remove amebiasis, but to combat secondary infection. Emetine injections alone are not sufficient. The administration of saline purgatives and bismuth mixture in the routine treatment proved of service in combating secondary infection. The importance of bismuth salts has been proved in the Panama epidemics of amebic dysentery; cases were very successfully treated by the administration of bismuth salts alone.

Polyvalent antidysenteric serum prepared in Alexandria from local strains of dysenteric bacilli was said to be useful in those cases in which a purulent diarrhea persisted in spite of the cure of amebiasis by emetine

treatment. This was a potent serum; it agglutinated all Bartlett's strains of dysenteric bacilli as well as paratyphoid A and B. Bartlett does not know how it was prepared. The Lister antiserum was said to be much less efficacious.

Opinions as to the value of antiserum treatment vary greatly; the majority of the clinicians place no reliance on it.

TREATMENT OF HAY-FEVER AND ASTHMA BY PITUITRIN AND ADRENALIN.

In the *Medical Record* of July 7, 1917, ZUEBLIN states that among his hay-fever patients there are four, two women and two men, who were treated by the pituitrin and adrenalin injections. Space forbids him to enter into a detailed analysis of their cases. Briefly speaking, on first examination they all revealed dilatation of the heart, with weak sounds, rapid pulse, low systolic and high diastolic blood-pressure, low pulse-pressure, digestive disorders, particularly marked indicanuria. Under pituitrin and adrenalin injections these cases showed in all at least reduction in the size of their heart, better heart sounds, improved blood-pressure findings; symptomatically the attacks did not return, or were lessened in intensity and severity. In giving his personal clinical observations on a few hay-fever cases, Zueblin is fully aware that definite conclusions from the present observations should not be drawn. From the theoretical and clinical standpoint two points seem of interest:

1. That the symptoms emanating from the respiratory tract are probably not the only ones present; that, at least as shown in the cases referred to above, there may be found definite signs of a cardiovascular deficiency—cardiac dilatation, weak heart sounds, abnormal blood-pressure findings, vasomotor weakness, associated with indicanuria of nutritional or intestinal origin, which functional disturbances may be favoring factors for the manifestations resulting from the pollen irritation. Somewhere, somehow, the pollen floating in the

air must reach the mucous membrane. Admitted the lack of a vasomotor tonus, a low circulation, and weakened heart condition, the possibilities are that the irritation of the pollen is more apt to cause the distressing clinical symptoms.

2. That from the therapeutic standpoint pituitrin administered in appropriate doses may remove the cardiovascular depression and in some instances cure, or at least alleviate, the clinical symptoms. The making of such a statement does not imply that pituitrin medication is the only substance to be used in hay-fever cases, nor does it mean that the pollen vaccination is out of place. As said before, the vaccination treatment has its usefulness and is apt to secure good results. From the clinical standpoint Zueblin believes that the attendant signs of vasomotor and cardiac weakness ought to be considered in the outline of treatment for hay-fever cases.

Admitting that the posterior part of the pituitary body plays a more important part in human physiology than generally supposed, especially with reference to the vagus nerve, it is at least probable that by the proper therapeutic use of pituitrin we are able to help the patient and secure him better protection from the tedious symptoms attributed to hay-fever.

SOME ANALYSES OF VEGETABLES SHOWING THE EFFECT OF THE METHOD OF COOKING.

The *American Journal of the Diseases of Children* for July, 1917, contains an article by COURTNEY and BARTLETT on this topic. They state that:

1. A large proportion of the mineral content of most vegetables is lost in the water used in cooking by boiling.
2. This loss is only slightly reduced by making the time of boiling a minimum.
3. A very great saving in mineral content may be effected by using the method of steaming.
4. Spinach is the best vegetable to provide a salt addition to the diet.

DIABETES INSIPIDUS, WITH SPECIAL REFERENCE TO THE ACTION OF PITUITARY EXTRACT ON IT.

In the *Archives of Internal Medicine* of July 16, 1917, CHRISTIE and STEWART report a study on a case of diabetes insipidus. The regulation of the excretion of water by the kidney was studied in a case of diabetes insipidus. It was supposed that on account of the high degree of diuresis, the great quantity of water ingested and transported, and the marked diminution in the excretion and ingestion caused by pituitary posterior lobe extract, the conditions for such a study would be unusually favorable.

The conductivity of the blood serum was slightly increased and the relative volume of serum slightly diminished when the water excretion was lessened by posterior lobe extract or by water restriction.

The blood flow in the hands seemed to be increased during the antidiuretic action of posterior lobe extract. This, so far as it goes, supports the view that a vascular effect in the opposite direction on the renal vessels may be responsible for the diminution in the urine excretion.

It was shown that under the action of posterior lobe extract the kidneys had the power of effecting a considerable concentration of the urine. Other kidney functional tests gave a normal response. Accordingly, no indication was obtained that the condition was in any way associated with a pathologic alteration in the kidney.

ACUTE GLAUCOMA OR IRITIS?

To the *London Practitioner* for August, 1917, WALLIS contributes an excellent article on this theme. He reminds us that when colored halos around artificial lights are complained of, one is very suspicious of increased intraocular tension. They result from the haze of the cornea, and the same play of colors is seen if spectacles seem to become steamed. Another prodromal symptom that sufferers sometimes observe is that a room, which is really light, becomes foggy and dark for varying periods of time. These two symptoms occurring together in an

elderly patient are pathognomonic, especially if the friends have noted on such occasions the eye is red and painful. Retching and sickness commonly result from the severe pain in the eye, but never with uncomplicated iritis.

To sum up, an association together of several of the following indicates an attack of glaucoma:

- (a) History of sudden onset, especially if in the evening or after the patient has retired to bed; colored halos and foggy rooms.
- (b) Severe darting pain in the eye and supraorbital region, particularly if accompanied by sickness.
- (c) Ciliary injection and a steamy cornea.
- (d) Shallow anterior chamber.
- (e) Sluggish, partly dilated, ovoid pupil.
- (f) Rapid loss of sight.
- (g) Raised tension.
- (h) Glaucomatous cupping of the optic disc.

In the first instance, Wallis tries to relieve the attack by means of myotics; he adopts the following routine in practically every case of acute glaucoma, and in the order given:

1. The patient is put into a warm bed with hot bottles, and a full dose of calomel is administered.
2. A drop of an oily solution of eserine and cocaine is instilled into the affected eye every ten minutes for an hour. It is also important to see that the other pupil is made to contract, because the shock of the attack, or of the operation later, may excite similar trouble in the sound eye. The drops are composed of eserine base and cocaine base $\frac{1}{2}$ per cent of each in olive oil. The advantage of using cocaine is that, apart from its alleviating pain in some measure, it counteracts the congestive effect of the eserine.
3. Three leeches are applied to the temple on the affected side as near to the canthus as possible. These creatures being now practically unobtainable, wet cupping is equally good and far cleaner.
4. Vigorous application of heat through the closed eyelids either by hot-bathing or by fomentations.

5. Sodium salicylate 10 or 15 grains and morphine $\frac{1}{4}$ grain hypodermically both relieve pain and cause diaphoresis.

This treatment is carried out for an hour, by which time, if it is going to prove efficacious, we shall find the pain assuaged, the pupil completely contracted, and the vision improved. If, however, the attack has not passed off entirely, it is not only useless to delay operative interference any longer, but highly dangerous. The whole point in the treatment by myotics is to relieve the condition so that an operation may be done as soon as the eye becomes quiescent, for thus a general anesthetic is avoided, and the operation is made easier and safer. The danger of delay, if the tension does not come down to the normal, lies in the fact that when vision has been greatly lowered it will not be fully restored unless the glaucoma subsides within twelve hours. The sooner operation is performed in unrelieved cases the speedier the recovery and the better the end-result. Acute glaucoma, like strangulated hernia, must be dealt with at any hour of the day or night.

LIGATURE OF COMMON CAROTID ARTERY.

SHAW (*Lancet*, June 9, 1917) states that in those cases of injury to the large vessels of the neck which escape death upon the field from primary hemorrhage, operative treatment is seldom called for before the patient reaches a base hospital. The conditions usually presented at a casualty clearing station are either a small deep traumatic aneurism or, more commonly, an arteriovenous aneurism of variable size, while in a few rare cases of severe reactionary or secondary hemorrhage ligation may be indicated.

An aneurism increasing in size or dangerously superficial in the neighborhood of a wound may necessitate early operation, but all other cases are best treated by rest and observation. At the end of fourteen days, if the tumor be stationary or decreasing in size, the patient may be transferred to the base, where spontaneous cure will

sometimes occur after several weeks, or operation can be performed when the limit of diminution is reached.

An aneurism existing for even a few hours is the best preparation for ligature owing to the fact that the collateral circulation is gradually and not suddenly called upon to supply the area of deprivation, and can adequately cope with the requirements of the tissues when complete cessation of supply through the original channels is effected. This is well exemplified in the case of the popliteal artery, where severance of the vessel by a bullet, even without much loss of blood, almost invariably leads to gangrene of the leg, while ligature for traumatic aneurism very seldom does so. The Lupfer tube aims at the performance of this function of an aneurism in the provision for a modified supply of blood while the critical period of collateral expansion is tided over.

During thirty months in a casualty clearing station, amongst a total of 44,000 wounded, the writer has seen only three cases in which ligature of the common carotid appeared to be indicated, each for one of the three conditions enumerated above—severe secondary hemorrhage, dangerously superficial aneurism, and a tumor which increased in size despite rest in bed.

The first case, the wound inflicted by a rifle bullet and eight hours later treated by an intravenous saline solution containing two drachms of brandy, suffered from a severe reactionary hemorrhage. The plugs were removed from his huge wound, together with many fragments of the jaw-bone. A ligature was applied to the twisted end of the facial artery, which was free in the wound. The following morning another severe hemorrhage occurred, and the patient was anesthetized and his internal carotid was tied. The wound became extremely septic. Violent hemorrhage took place while the patient was drinking lemonade. The common carotid was then tied through a transverse incision, this wound remaining clean. The operation was followed by aphasia and hemiplegia for three days. Both these conditions cleared up entirely.

The second case was that of a large superficial arteriovenous aneurism incident to a shell wound. In view of this the common carotid was tied. The patient recovered.

The third case, the wound on the right side of the neck by a shell fragment, walked into the casualty clearing station eight hours after being hit. The wound was small and in the midline of the sternocleidoid. There was immediate bleeding, which stopped spontaneously. A small pulsating tumor was felt, together with a thrill and bruit. This tumor increased in size for two days and caused little discomfort. After progressive betterment until the eighth day there was increment of swelling, which occurred toward the root of the neck. The common carotid was ligatured about one and a half inches above the innominate bifurcation. The apparent aneurism sac was opened, and from it flowed creamy pus. An inner tumor about the size of a large hen's egg then became visible as the real aneurism. The aneurismal sac was opened, a distal ligature applied, and the wound not closed. The patient died four hours later.

SIMULATION OF DISEASE.

In an epitome of current medical literature on this subject the *British Medical Journal* of July 17, 1917, after quoting the unsatisfactory study of the psychology of simulation, alludes to artificial skin eruptions of which pustulodermatitis is the most common, these lesions being gathered together in patches, mostly placed on the hairy parts of the face, often on the ears and neighboring parts, or on the front and left surfaces of the thigh. An important diagnostic point is that the pustules are all in the same stage of evolution. For the production of these eruptions croton oil and thapsia are chiefly used. Artificial phlyctenular dermatitis is not common. Milian states that automobile oil will sometimes produce lesions suggesting at first sight an erysipelas. Edema is produced by tying a wide flat strap on the forearm or the lower part of the leg during the night. Artificial ulcer is not readily identified. Persistent

ulcer in a young man, otherwise healthy, is probably artificial. These sores are not in the usual position for chronic ulcers. They are commonly on the legs at places within reach of the patient's right hand. They may be caused by a blister or a caustic agent. If the patient be an old syphilitic diagnosis from gumma may be difficult. Artificial mucous patches are produced by the lighted end of a cigarette. They make lesions on the left side, situated on the inner surface of the lower lip not far from the commissure, in the cheek, or on the velum, never on the pillars of the fauces or the tonsils.

Carruccio notes that he has seen more than a hundred soldiers with an acute dermatosis of practically identical nature. These lesions were produced by the application to the skin of vegetable substances, such as pounded roots of *Daphne gnidium* and the juice of the cactus leaf. When rubbed over the entire body they caused a somewhat intense erythema.

Ascarelli states that one of the most common forms of lesions inflicted on themselves by Italian soldiers are abscess and phlegmon produced by injection of petrol, turpentine, benzine, chloride of lime in benzine solution, etc. They most commonly select the lower limbs, often the calf, the instep, and sides of the knee, sometimes the buttocks. The patient appears shortly after the injection, ascribing the swelling to a fall or a twisting of the part or to a contusion. There is always slight albuminuria, without casts. At times there is emphysematous crepitation. An incision shows comparatively little pus. Sometimes abscesses are produced by injection of fecal matter. There results a deep phlegmon accompanied by grave sepsis.

Gradenigo states that artificial otitis is fairly common. As a rule the effects produced are suppuration, exceptionally perforation of the membrane. Caustic is used in such strength as to produce destructive inflammation. The complications at times are serious.

Van Schevensteen observes two types of conjunctivitis—one produced by powdered ipecacuanha, the other by agents of very

various kinds which produce anomalous lesions. The introduction of ipecacuanha causes intense injection with chemosis, with slight secretion. The reaction subsides in a few days, but the mucous membrane long retains the salmon tint which reveals the origin of the lesion. Ectropion with lacrimal stasis may result from repeated applications. Eosinophilia, according to Bollack, is noted in the cytological examination of the secretion, and is characteristic in the artificial affection although it comes on late. Castor-oil seed is used to produce conjunctivitis.

TRANSVERSE COLOSTOMY.

LOCKHART-MUMMERY (*Practitioner*, August, 1917) states that transverse colostomy offers obvious advantages when the disease is in the sigmoid flexure, and should certainly always be preferred to cecostomy, which is never a satisfactory operation. In old and debilitated persons suffering from intestinal obstruction which requires immediate relief, transverse colostomy has the advantage that, if performed in the way described here, the danger of peritonitis is greatly diminished from the fact that omentum completely surrounds the bowel where it passes through the abdominal wall, thus shutting off the peritoneal cavity. A contraindication to transverse colostomy is a very short gastrocolic omentum and a small stomach. This is indicated on opening the abdomen by finding that the transverse colon will not easily come out of the wound, and when pulled upon the lower edge of the stomach comes into view. If a transverse colostomy is performed under these conditions, it may seriously interfere with the movements of the stomach. Such a condition is certainly unusual, but the author has met with it on one or two occasions, and has always preferred to do a sigmoid colostomy rather than run the risk of producing stomach symptoms. The incision he uses enables either the transverse colon or the pelvic colon to be brought up, according to whichever seems to be the more suitable.

The best incision is a vertical one over

the middle of the left rectus muscle, the upper limit being at or just above the umbilical level. The ideal length of the incision is two inches, but in practice this must depend upon circumstances, such as the amount of fat and the thickness of the muscle. It should, however, always be as short as possible. The anterior sheath of the rectus having been divided, the fibers of this muscle are separated by blunt dissection and the abdomen opened. The great omentum is then found and drawn out of the incision until the transverse colon is met with. The transverse colon must be investigated to see what length is available. If it is found that there is plenty of bowel and that it can be brought up to the surface without undue traction on the stomach, a part of the transverse colon is selected as far up toward the splenic flexure as is compatible with a reasonable freedom from tension. The fingers of the left hand are then passed under the great omentum, and the selected portion of transverse colon is pushed up with the fingers through the omentum overlying it. With a pair of blunt dissection forceps held in the right hand, a hole is then scratched in the great omentum till the colon itself is exposed, care being taken to avoid any obvious blood-vessels. When a sufficiently large hole has been made, the colon is pushed through it until a glass rod can be passed beneath the bowel, and a piece of rubber tubing of suitable size is passed over each end of the glass rod so as to retain it in position. The whole of the omentum is returned into the abdominal cavity, leaving the selected knuckle of colon completely surrounded by omentum, which occupies its normal position under the abdominal wall. The ends of the skin incision are now closed by stitches in the usual way. The glass rod, instead of lying across the wound as in sigmoid colostomy, will lie up and down it. An obvious suggestion is to make the skin incision transversely, so that the glass rod does not lie on the wound. The objection to this is that a transverse incision cannot be extended if an abnormality is discovered, and no harm results from the presence of the glass rod over the wound.

After transverse colostomy, the bowel usually has to be opened much earlier than with sigmoid colostomy, for symptoms of obstruction tend to come on quickly, and it is generally advisable to open the bowel within thirty-six hours. This is of little consequence, for the omental shield completely protects the abdominal cavity from any fear of infection, even if the wound should become septic, which is very seldom the case. Nine days after the operation the glass rod is removed, and one blade of a pair of scissors is passed under the bowel in the track of the glass rod, and the bowel cut completely in half. At the same time any redundant bowel outside the skin is cut away, bleeding points, which are often numerous, being secured with catgut stitches. Stitching is better than attempting to pick up the bleeding points with forceps, for the tissues do not hold forceps well. It is very important to cut the colon completely in half, for this arrests the peristaltic wave at the colostomy opening and prevents it continuing down into the distal gut. A properly completed colostomy opening should, after healing, show no mucous membrane projecting above the skin surface, and the opening into the colon should only just admit the finger.

The period of recumbency after an operation for transverse colostomy must depend upon circumstances. If only a small incision has been made and the patient is otherwise a healthy subject, there is no necessity for him to be kept in bed for more than ten or twelve days. On the other hand, if the patient is very stout, a fact which necessitates a large incision, or old and weakly, in which case healing will probably be slow, a longer period is necessary.

Many different kinds of belts have been invented, and patients have tried all of them. Provided the actions of the bowels can be properly regulated, which is the case with the majority of patients, by far the best apparatus is a simple belt with an india-rubber section where it passes over the colostomy opening. A pad of wool is worn under this, and kept in place by the belt. No other apparatus at all is used, and it is very

much the best arrangement in most cases. Some patients prefer to have a celluloid cup over the colostomy opening, but this should not be incorporated in the belt, but separate from it. If no regularity in the actions of the bowel can be established, some form of apparatus with a receptacle for the evacuations must be worn.

Success depends upon establishing the normal rhythm of the evacuations and in preventing liquid stools. It is obvious that liquid stools cannot be controlled by any colostomy opening, however perfect. There are two methods of controlling the bowels after colostomy. The first consists in encouraging the bowels to act at a regular time each day by suitable dieting and by avoiding the use of aperients.

As a rule, the action of the bowels quickly becomes surprisingly regular, but an aperient inevitably upsets the rhythm for several days. If the stools are too loose, the amount of liquid drunk during the day should be reduced, and the patient must be very careful to avoid rich or unusual dishes. It generally takes from four to six months before the patient gets any control, in the sense of knowing when an action is going to take place. Some patients never acquire this sensation, but in the majority of cases the knowledge of an impending evacuation is acquired in time. The writer alludes to a woman, aged thirty-six, under his care in St. Mark's, who has had a colostomy opening for twelve years. She assured him that the opening caused her no inconvenience and that she had not had an accident of any kind with it during the last five years. She is a hard-working woman, and the opening does not in any way interfere with her daily life.

It is not fair to judge of the results in cases in which the colostomy has been performed in elderly people in order to relieve obstruction, or for inoperable malignant disease. One must judge by those in which the operation has been done for other conditions, or in which the growth has been removed successfully at the same time or subsequently; in such cases the results, as regards comfort, are very good. The con-

dition is not at all incompatible with living an ordinary busy life. The author has had a number of patients who lead very active lives and suffer very little inconvenience from the altered method of evacuating the bowels. Several of these patients hunt regularly during the season, and play golf without any inconvenience, and he has one patient who earns his living as a stevedore at the docks, and who fought in a boxing competition.

The second method of controlling the bowels after colostomy is for the patient to give himself an enema every morning, but this should only be adopted if the first method, after patient trial, proves a failure.

The indications for colostomy may be stated as follows:

As a preliminary to excision of the rectum for cancer.

To prolong life and prevent obstruction in cases of inoperable cancer of the lower bowel.

In all cases of pericolicitis of the lower part of the pelvic colon where resection or short circuiting is impossible.

In some cases of intractable ulceration of the rectum.

In cases of intractable fibrous stricture of the rectum.

As a temporary measure in severe wounds of the rectum.

GUNSHOT WOUNDS OF THE KNEE-JOINT.

CAMPBELL and WOOLFENDEN (*Lancet*, Aug. 11, 1917) set forth certain views concerning the treatment of these injuries which receive the indorsement of Surgeon-General Sir George Makins. The lines along which the treatment must be based in septic cases are:

The lowering of intra-articular tension by evacuation of the exudate, thereby preventing the tracking of infection along the fascial planes.

The rapid overcoming of infection and the removal of infective material as soon as it is formed, thereby diminishing supuration.

The promotion of the formation of adhesions, thereby limiting the area of infection and diminishing the area of the surface for toxic absorption.

The removal of pressure from the articular cartilage, thereby diminishing the chances of its becoming eroded.

All of these four ends appear to have been more or less satisfactorily attained in the writers' last series of cases during the past six months, since the results obtained are so much more satisfactory than in those previously treated; indeed, if one case is excluded in which the leg was amputated for gangrene due to concomitant laceration of the popliteal vessels, and two that died, the one suffering on admission from septicemia and the other from intense and fatal anemia as the result of blood lost at the time of injury, they have had out of 60 cases 59 recoveries, and only one amputation.

Various types of gunshot wounds are met with; from the practical point of view these are best classified as follows: Simple perforation with small entrance and exit wounds, almost invariably due to a rifle or machine-gun bullet; penetrations (a) without retention of the foreign body, (b) with retention of the foreign body; perforations with large entrance and exit wounds; fractures secondarily involving the joint, which are almost invariably accompanied by the presence of varying degrees of bone injury and sepsis.

The present methods of treatment in severe cases are based on three fundamentals: (1) Absolute rest and fixation; (2) the strictest asepsis; (3) the use of Carrel's method of wound treatment.

Absolute rest and fixation of the joint was secured at once, whatever the hour the patient entered the hospital. This is done in the following way: The fully extended limb is placed in an efficiently made Thomas knee-splint and extended by the fixed method, using for this purpose stout calico bandage glued to the leg and tied round the end of the splint. The limb is supported in the splint by two sheets of perforated zinc 4 by 6 inches bent lengthwise to accommodate the transverse curve of the part. These

sheets are supported in turn by bands of aluminum strapping bent over each side of the splint. One of these sheets of zinc is laid under the thigh, the other under the calf; their position and the amount of weight that each bears can easily be regulated by bending the metal strapping at a suitable place. These supports, once applied, are never removed if it can possibly be avoided—not even for operative procedures. In this way rigid support is given to the limb and absolute rest and fixation are secured.

To prevent too much local pressure on the muscles by the metal supports the remaining surface of the limb is supported by bands of stout flannel bandage, pinned round the splint. These flannel bands can easily be removed and reapplied with each dressing as far as is necessary. They also help to keep the dressings in place. There is no doubt, in the authors' minds, as to the superiority of fixed over mobile extension—granted that the extension is attended to daily and tightened up as required by the stretching of the skin. If the extension becomes inefficient, "night starts" make their appearance, but can be easily controlled by readjusting the extension. Unless the flannel bands under the knee are kept sufficiently taut, and the metal supports slightly raised as the muscles atrophy from pressure, there may be, and in some cases actually is, a tendency to the production of genu recurvatum.

Asepsis must be efficiently carried out, not only at the time of operation but also at each subsequent dressing. With this end in view it has been their custom to have all cases of wounds involving the knee-joint sent, as far as possible, to one ward, and under the care of a single medical officer (one of themselves, J. C.), and also to have all the dressings done by the same person on each occasion, in order to avoid any division of responsibility in the treatment of the individual cases.

The use of Carrel's method of wound treatment showed a marked improvement in the recent results, due to its adoption. The tubes are used either uncovered or covered

with cheap Turkish toweling. The perforated portions of the tubes are passed over the entire surface of the wound and in each recess of the wound, down to its very extremity, so that in the latter case all the perforations lie hidden in the recess.

The wound is then dressed as usual with gauze moistened in hypochlorite solution, and the open ends of the tubes left free outside the dressings. Two to three drachms of a 0.5-per-cent hypochlorite solution are squirted down each tube, day and night, at two-hourly intervals, with perfect regularity.

With this method of treatment efficiently carried out they found:

That infection is most effectually counteracted.

That organisms and the pabulum suitable for their growth are washed outwards, even from the deepest parts of the wound.

That ingress of sepsis from without is prevented—to their minds a most important consideration in the treatment of knee-joint cases.

That pus only forms in small quantity.

That adhesions of the synovial membranes form with great readiness.

That the patient need only be dressed once in twenty-four or forty-eight hours.

In other words, this method of treatment fulfils all the requirements which the authors stated above were so necessary to the successful treatment of infected cases.

Absolute rest and fixation, secured as above described, were made use of in every case, and were all that was necessary in (a) cases of clean perforations, (b) cases of very mild sepsis.

Aspiration was never used as a routine practice, save for the purpose of making a bacteriological examination of the joint fluid. The damage done to the joint and its synovial membranes by this procedure in mildly septic cases more than compensates for the advantages gained.

Exploration and washing out of the joint cavity, followed by suture of the wound, was used only in cases showing moderate degrees of sepsis, not localized by adhesions and not progressing favorably. After the application of a tourniquet the joint was

explored in the usual situation, the cavity washed out with a mixture of eusol and hydrogen peroxide, and every particle of fibrin that could be seen was removed. The greatest care was always taken that a perfectly free exit was allowed to the fluid for fear the recesses at the back and closed-off parts of the joint be opened up and sepsis be driven into them. The wound was sutured in layers with ten-day chromic cat-gut; the synovial membrane by a continuous suture; the capsule, muscle, and deep and superficial fasciæ in separate layers by interrupted sutures. The skin edges were united by interrupted silkworm-gut sutures. Finally the limb was very firmly bandaged. Several of these cases had to be fully drained later on. The authors think this method has only a very limited application.

The local application of Carrel's tubes to the wound surface was invariably used in cases in which a wound of any size led into the joint cavity. When the wound appeared fairly clean and was more than thirty-six hours old, no operative procedure was ever adopted. The entire wound surface was covered by the tubes.

Excision of the wound locally, down to and including the capsule, but without interfering in any way with the synovial membrane, was used in those cases in which the wound was recent (under forty-eight hours old) and septic, particularly when it was very septic in its superficial part, and hence there was a considerable risk of the spread of sepsis into the interior of the joint. After excision the wound was left widely open and covered by Carrel's tubes.

If it was thought necessary in these cases to explore the joint, it was done through a separate incision and the procedure treated as though it were an entirely new operation.

Local insertion of Carrel's tubes into the joint through the original wound was fairly frequently resorted to. It was never done shortly after the infliction of the wound, but only after method No. 4 had failed and it was found that definitely infected fluid was exuding from the joint, and it appeared probable that the sepsis was localized to only one part of the joint cavity. Even in

more generalized infections, when of moderate severity, this method was of use. It was found particularly satisfactory in those cases in which there was severe fracture of the patella and in which not infrequently severe sepsis developed in the anterior part of the joint cavity.

The number of tubes inserted varied, but was never more than three. They were passed into that part of the joint that was infected; the lines they were to occupy were those along which the greatest quantity of infected material could be evacuated by very gentle pressure. The tubes were changed either daily or once every two days. When the general joint cavity was locked off and there remained a narrow track along the line occupied by the tube, this last was removed. In some cases, usually only when the tubes had had to remain in the joint for a number of days, counter-opening at the extremity of the sinus was necessary to secure rapid healing.

Drainage of the joint by free incisions and the insertion of Carrel's tubes was used in cases of complete comminution of the patella with a large entrance wound over the same. When the case was received early—*i.e.*, within twenty-four hours of injury—immediate operation was performed because of the risk of infection from without. A U-shaped flap, including the patella, was turned upward and the fragmented patella and the skin wound excised *en masse*. The joint cavity was carefully washed out as completely as possible, and the lower part of the flap sutured back in place with stout silkworm-gut. Three or four covered Carrel's tubes were inserted from side to side, and replaced by uncovered ones after two days. These, in turn, were completely removed on the fourth day and the incision completely closed. In these cases, if the posterior part of the joint is severely infected, posterior drainage may have to be used at once or later on.

In cases of severe and diffuse arthritis the joint was fully drained by lateral and posterior incisions in the manner described above. The joint cavity was washed out very carefully indeed, and all flakes of

lymph removed, as far as possible. Covered Carrel's tubes were then inserted as follows: Anteriorly, four from side to side, one at the uppermost extremity of the subcrural pouch, one under the ligamentum patellæ, and two others intermediate in position; laterally one under cover of each lateral ligament passing backward through the posterior synovial pouches into the posterior wounds. Other covered tubes were laid on the surfaces of all the incisions. As a general rule no dressing was done until the second day, when the covered tubes were carefully removed under gas and replaced by uncovered ones occupying the same tracks. On the fourth day the anterior ones were removed altogether and the lateral ones changed, these being retained till the sixth or eighth day.

No washing out of the joint was attempted; they merely syringed the surface of the wounds, using perhaps a little very gentle lavage for the tracks, taking the utmost care not to break down any adhesions. All flakes of lymph were most carefully removed.

The dressing was usually changed only every second day, and uncovered tubes were laid along the incisions.

In this way the entire joint cavity readily became obliterated completely after about a fortnight or three weeks.

In cases of severe and diffuse arthritis accompanied by fracture the same method of treatment was adopted as in the above cases, but all loose and necrotic bone was most carefully removed, paying particular attention to the fractured surface left behind. Here the Carrel's tubes continued to be laid on the fractured surface till it had completely granulated.

Amputation was reserved for three types of cases:

For cases of severe joint injury accompanied by injury to the popliteal vessels.

For cases in which there was severe comminution of tibia or femur, or both bones.

For cases in which there was extensive osteomyelitis of tibia or femur. (This was usually suggested by the marked pain and tenderness along the entire length of the

affected bone, with the very severe general condition of the patient.)

Owing to the risk of osteomyelitis arising the authors consider that early operations in the way of efficient drainage both of the joint and the fracture should be resorted to, otherwise amputation or death is certain to result.

The treatment of these cases depends largely on the nature of the foreign body—whether rifle bullet, shrapnel ball, or shell fragment; its size; its position; the time it has been lodged in the joint; the presence or absence of infection.

As a general rule rifle and shrapnel bullets may be left inside without much risk of infection, granted that the joint is properly immobilized; but a careful watch should always be kept for the onset of sepsis. In the case of shell fragments, however, it is a different matter; these as a general rule, especially when large, are best removed as early as possible and at the first opportunity. But due consideration must be paid to the facts described below.

Small foreign bodies the authors have usually left severely alone, and practically speaking they have never given rise to any trouble. The risk associated with a prolonged search shortly after injury appears to them to be too great to justify operation, more especially as quite a number of such fragments cannot be found.

A foreign body, whatever its nature, when deeply embedded in bone is usually best left entirely alone, especially shortly after injury, owing to the risk of lighting up sepsis. Most of these can be left permanently in place. When foreign bodies are readily accessible and can be removed without much disturbance there is no great risk in interference, but when they lie in an inaccessible situation—*i. e.*, in the posterior part of the joint close to the intercondyloid notch—and are small, no attempt to interfere should be made owing to the difficulty in finding them.

The best time for the removal of foreign bodies is undoubtedly immediately after the injury. If not removed within two or three days of the injury, foreign bodies are best

left for several months till all risk of infection has died away.

A foreign body in a septic joint should always be immediately removed, if possible, and the joint cavity carefully washed out. The subsequent closing up or leaving open of the joint must be decided by the bacteriological findings, the general condition of the patient, and the local condition found at operation.

Before proceeding to remove the foreign body the original wound should be excised down to and including the capsule and carefully covered up. The limb is then most carefully resterilized. The foreign body should not be removed through the original wound, unless it lies immediately under it, but through a fresh incision. The position of this depends on the site of the foreign body as revealed by *x*-ray examination; generally speaking, this is that used for removal of a loose cartilage; but if the foreign body is lodged behind the condyle it may be better to make a vertical incision over the joint interval just anterior to the corresponding hamstring tendon. After removal the joint cavity is most carefully washed out without force, and the wound sewed up in layers.

MEDICAL EXAMINATION AND THE AVIATION CORPS.

CHAMBERLIN (*Cleveland Medical Journal*, August, 1917) observes that the government is requiring that each member of the Aviation Corps be a perfect man, who must have had two years of college work, or its equivalent. He must, moreover, be perfect in hearing and sight, the latter without correction or glasses, and have a perfect sense of equilibrium. The author states that up to the present the tests in our own as in other countries have been extremely crude, but the United States requirements to-day are more rigid and exacting than those of any nation. The possible reason for this is that with our inexperience we have taken up the tests which those older in the war have found not to be largely helpful in deciding as to the fitness of those who shall serve.

Chamberlin calls attention to the fact that a man's knowledge of his position in space is gained from three sources: His muscle sense, by which he recognizes, *e. g.*, whether his forearm is extended or flexed and whether his feet are dangling or planted on the ground; his eyesight, by which he is made conscious of his relation to surrounding objects; and his vestibular apparatus, the utricle, saccule, and semicircular canals. This apparatus, though situated in the petrous portion of the temporal bone, in close apposition to the organ of hearing, has possibly less to do with the latter than it has with the organ of seeing. The aviator, seated in his machine, receives little or no help from his muscle sense, while his frequent passage through dense clouds or at night in complete darkness may deprive him of any sense of orientation ordinarily gained through his eyes. He has become, for the moment, the bird flying through a fog or mist, or the bat which flies at night only. In such cases he must depend entirely upon a proper sense of equilibrium, gained through an intact and unimpaired labyrinth. So upon the examiner, the physician, in the last resort may depend the safety of the aviator, of his machine, and of the army to which he is to furnish information.

The testing of the vestibular apparatus involves an interesting bit of technical knowledge, discovered and elaborated by Robert Barany of Vienna.

The applicant is first placed on a properly constructed revolving chair, with stop pedal attached. With eyes closed and head tilted 30 degrees forward, thus bringing both horizontal semicircular canals into the plane of the turning, he is now revolved ten times to the right in exactly twenty seconds, when the chair is brought to rest by means of the pedal. With vision directed on a distant object, there should now occur a horizontal nystagmus (a quick, jerking movement of the eyeballs to the left and a slow return to the right), during a period of 26 seconds. A variation of eight seconds, more or less, is allowable. This constitutes the normal. A variation of more

or less than eight seconds is absolute ground for rejection. The test is now repeated with turning in the opposite direction, toward the left. When the turning has ceased this will give a quick movement of the eyes to the right and a slow return to the left.

If the normal individual, with eyes closed, extends his arm and forearm straight before him and touches the examiner's finger, he will be able to bring the arm to the perpendicular and again touch the finger of the examiner, without deviation to right or left. The test is made for both right and left arm. The applicant is now turned ten times to the right. When the turning has ceased he is directed to touch the examiner's finger, and touch it again, after bringing the arm to the vertical. He will now point several inches to the right. This is called past-pointing. The normal subject will past-point three times to the right, when he will again point correctly. The test is made with both arms. It is then repeated, after turning to the left. If the applicant past-points more or less than three times he is rejected.

With head inclined 90 degrees forward, thus bringing the vertical semicircular canals into the plane of turning, the candidate is turned to the right, five turns in ten seconds. On raising his head or his body to the vertical it inclines to the right. Similarly on turning to the left it inclines to the left. This tests the vertical semicircular canals. Inability to satisfy these tests is also cause for rejection. By means of the above tests it will easily be able to distinguish the absolutely abnormal. There will remain, however, a third class of questionable or border-line cases. In such cases further tests may be made. If the right ear is injected with cold water (68° F.) there should occur a rotatory nystagmus with quick component to the left, and *vice versa*. While the turning test stimulates both labyrinths simultaneously, the latter, or caloric test, enables us to differentiate and decide exactly which labyrinth is failing to perform its function.

Further information in regard to the sense of equilibrium is given by the static

and dynamic tests. The former is the familiar Romberg test, while the latter consists in having the candidate walk twenty feet forward with eyes closed, then backward to the point of starting. Refinements of the above tests would be standing on one foot while the other is allowed to rest on the knee or instep, hopping forward twenty feet and back to point of starting, etc. Special stress is laid upon free nasal passages and diseased tonsils. Operation is demanded when abnormalities exist, and if refused constitute cause for rejection. The eye examination is equally severe.

THE EARLY TREATMENT OF COMPOUND FRACTURE OF THE FEMUR CAUSED BY GUN-SHOT WOUNDS.

DUN (*British Medical Journal*, Aug. 18, 1917) writes on the basis of practical experience gained in working at casualty clearing stations and in the main deals with treatment carried out in them, but he believes that it is the regimental medical officers and field ambulances in front of the casualty clearing stations who have it in their power to give the best possible start in the wounded man's race for life. A definite line of treatment must be adopted as early as possible—that is, by regimental medical officers and field ambulances, and carried on at casualty clearing stations.

The factors to be dealt with are shock, hemorrhage, and sepsis. Up to the time the patient is put on a stretcher a method as good as any is to fix the thigh with short local splints and to tie the thighs and legs together.

This is the time when shock is severe and for the treatment of that immediately following injury. There is a second class of shock which results from very often unavoidable incomplete fixation of the fractured limb, and frequent handling of the patient in his journey from the field to the ambulance. The best and simplest method of completely immobilizing a fractured femur is a properly applied Thomas splint, and this should be put on as early as possi-

ble; it would be ideal if it could be done at regimental aid posts or advanced dressing stations. Another ideal would be attained if the cases of fractured femur could be transported from advanced dressing stations to casualty clearing stations without removal from the ambulance, so reducing the movement of the patients to a minimum.

Tourniquets should be avoided, of course. Large vessels may have to be ligatured, but the most frequent form of hemorrhage, and one which should always be vigorously dealt with, is slow oozing from the wound. This should always be checked, and often requires opening up and the application of ligatures or forceps. Failing this, direct pressure with a firm packing of gauze into the opened-up wound may be sufficient. A cork of gauze is worse than useless.

To combat sepsis in the early stages, all that can be done is rapid disinfection of the skin for a considerable area around the wound or wounds. For this the author advises a 5-per-cent solution of picric acid in methylated spirit.

The wound itself, he believes, should not be interfered with. The insertion of drainage tubes is unnecessary. Dressings should only be changed if soaked with blood.

Arrived at the casualty clearing station, the patient is anesthetized before being lifted off the stretcher or having his clothing removed. The skin is widely cleansed as already described. The superficial wound is excised and the main pockets are determined by digital examination and opened widely; the full extent of injury to muscles being seen and not merely felt. Amputation is indicated when the blood supply is completely cut off, the artery and vein completely severed, and collateral circulation has not been established; or where for anatomical reasons complete excision of any infected part cannot be carried out and virulent sepsis is already established in extensive wounds, the patient being in a low condition. A circular or a modified circular method is indicated as low down as possible.

The dressing thereafter is by a salt pack or the Carrel method. These are the two methods in the after-treatment of all

wounds made by the surgeon. The Thomas splint outfit is the simplest method of obtaining complete fixation. The details of its application are as follows:

It is not necessary to shave the limb. Paint the entire circumference from the malleoli upward, sufficiently high to allow the extension to get a good pull on the lower fragment, with a glue solution, of which the formula is:

Glue,
Water, ää 50 per cent;
Thymol, $\frac{1}{4}$ per cent;
Glycerin,
Calc. chloride, ää 2 per cent.

A shaving or small painter's brush is used for applying the glue. During an action a pot of this glue should always be kept ready melted. The glue will become too thick after a time, and a little water should then be added.

Next apply, on either side of the limb, a length of bleached calico bandage, and run a roller bandage round the limb.

In the application of the splint the ring of the splint is passed over the foot and pushed upward, until the posterior part of the ring presses firmly against the ischial tuberosity.

The surgeon takes an extension bandage in each hand and passes one of them over, the other under, the lateral bars of the Thomas splint. First one bandage and then the other is thereafter passed round the notch in the cross-bar, a complete turn being taken in each case. The turns are taken in opposite directions, and the last overlaps the first. The ends are made secure by tying a half-bow.

In cases in which the wounds are in such a position that it will be necessary to remove the ham splint for dressing purposes, slings formed by bandages or, better still, perforated zinc strips should be applied at this stage.

The "ham" splint should be padded to suit each case. Moss pads serve the purpose well. Over these a sheet of jaconet is placed to prevent soiling. The ham splint is now slung to the side-bars of the splint by three strips of adhesive plaster—the adhesive side being next the ham splint.

This effectually prevents lateral movement of the ham splint.

In the application of the anterior thigh splint, which consists of a piece of Gooch's splinting applied to the thigh, canvas side toward the limb, it should extend from near the ring of the Thomas splint to just above the patella. A number of suitable lengths of Gooch's material should be cut beforehand. The whole roll may be sawn through; an orderly can cut off any breadth required. The thigh splint is fixed by the bandage, which is now applied to the limb from the ankle upward. This bandage encircles all the splints.

In the application of the foot-piece, the foot must be supported at a right angle by means of the metal foot-rest, which is supplied with the outfit. A bandage sling passed round the ball of the toes, fixed there by glue on the sole of the foot, and pinned on either side about the knee level to the bandage which surrounds the limb, is perhaps more comfortable to the patient. An oblong piece of splint rather longer than the breadth of the foot, padded thinly and covered with jaconet, will prevent the bandage pressing on the sides of the foot. Glue will prevent slipping of both bandage and splint.

The suspension stretcher bar should always be used. To this the Thomas splint is slung by two pieces of bandage, one attached to either bar of the splint. If no suspension bar is available, the leg must be slung by some other means.

Similarly, if the patient cannot be evacuated, the injured leg must be slung in the wards. A simple method is the use of two bandages, each passed over a beam of the hut. The two ends of one bandage are then tied to the bars of the splint close to the ring. The ends of the second bandage are secured to the bars at the level of the foot.

PAGE and LE MESURIER (*British Journal of Surgery*, July, 1917) agree with Dun that for purposes of transport the Thomas knee splint, or one of its modifications, is the best available. With its later use they are not in full accord. They are firmly convinced that in fracture of the lower third of the

femur the commonly occurring flexion of the lower fragment is seldom, if ever, completely controlled by a straight Thomas knee splint. For these cases they have used the Thomas splint, but bent at the knee level, thus obtaining a skeleton-inclined plane. By the use of this method they have much improved their results. They insist upon the importance of a primary complete surgical procedure at the casualty clearing station, all fragments of bone lying loose being removed. They prefer that the bone should be packed with dry, sterile gauze. If the original wound or wounds cannot furnish posterior drainage a four-inch incision should be made on the posteroexternal aspect of the limb, and access gained to the seat of fracture along the line of cleavage between the outer hamstrings and the vastus externus: a part of the latter will have to be cut away in order to make the opening a free one.

The primary gauze pack should be left undisturbed for two or three days, in the absence of signs of spreading infection; it should be removed and lightly renewed at intervals for a week or so; at the end of this period no further mechanism is needful to keep the wound open. A tube drain through the posterior hole down to the bone should be employed when there is evidence of continued osteitis and retention of discharge. Spreading cellulitis of streptococcal origin, arising as it commonly does soon after the injury, is best left to take its own course, assuming that proper drainage has been established in the first place. Further incisions at this stage rather hinder than assist the patient's natural defence.

The gas bacillus, though present in many cases of severe infection, does not lead to progressive necrosis and toxemia in those in whom the wounds have been laid open in good time. If gas formation occurs in such an open wound, and no severe toxemia is present, the case should be left quiet, and the wound will rapidly clean up. When spreading gangrene occurs, free incisions may suffice to arrest the process; if there are signs of severe toxemia, amputation will be the only course.

In the period of transport the Thomas knee splint is the best available appliance. It affords means of efficient, self-contained extension, and allows of free access to all wounds. Moreover, it is sufficiently efficient even when the ring does not fit.

The Thomas knee splint is suitable for all fractures occurring in the lower two-thirds of the bone. It secures the necessary immobilization under moderate extension, and affords free access to the wounds. For all fractures in the upper third the Hodgen splint is well suited at this stage.

During the period of healing—that is, commencing the second or third week—the lower third of the bone is placed in a Thomas splint; the leg is pulled out to full or over length, and then, generally under anesthesia, put up in flexion in the same splint bent at the knee level. In the upper third the Hodgen splint is generally used. The proper action of the Thomas splint depends on a close fit of the ring, so that the upper point d'appui shall be the ischial tuberosity.

The Hodgen splint is employed in the standard pattern, but the original form of suspension and extension is not used. The splint is hung from a Balkan beam, extension being applied by a weight attached to the end of the splint, the attachment running over a pulley in the upright of the beam.

Extension is of the Buck type, applied either with adhesive strapping or by means of Heusner's glue applied to fine cotton bandaging. This glue is made up as follows:

Methylated spirit, 50 Cc.;
Benzine, 25 Cc.;
Resin (commercial), 50 grms.;
Venice turpentine, 5 grms.

Ordinary adhesive strapping is less irritating and lets go gradually instead of suddenly, as is the case with glue. Transfixion pins are used where it is impossible to apply a Buck extension. For the femur pointed steel pins 4 mm. in diameter are used, and for the os calcis similar pins 3 mm. in diameter.

Anklet extension attachments have not proved a success. Skeleton splints are com-

pleted by slings, old linen answering better than any other material. This must be so placed that when the dressing slings are taken off the bones are held supported by the remainder. Extension is secured by a strap passing over the notch in the splint and the stirrup of the extension. These splints are, of course, suspended. When a sore forms over the ischium, weight extension may be attached to the lower end of the splint, as is done in the Hodgen splint. The parts exposed to pressure are cleaned with spirit, powdered, and gently rubbed twice daily. In early transport powerful extension should not be applied, and any complaint of the patient should be carefully attended to.

In these splints the foot should be allowed to lie in a natural position—i.e., slightly everted and plantar flexed. They should be encouraged to move the foot at intervals. The foot-drop should not develop. When there is some degree of paralysis of the anterior tibial group a plaster splint is molded to the sole of the foot and the latter is balanced by a small counter-weight acting over a pulley on the beam. This method allows of active movement at the ankle, while normally maintaining the paralyzed muscles in a lax position. Fixation of the foot to an arch or foot-board attached to the splint is not so satisfactory for prolonged treatment.

For the first week or so no forcible effort should be made to pull the leg out to full length in the severely infected cases. In the clean cases, or in those mildly infected, the bones should be brought into their proper position in the first week of treatment. The alignment is based on x-ray plates. Axis traction is the main factor which determines the return of the fragments to their natural position. In dealing with the lower half of the femur, flexion of the lower fragment (except in impacted cases) is constantly observed; the muscles, acting unopposed, which produce the displacement being the gastrocnemii and short head of the biceps.

After reduction, when the violence of infection has subsided, the leg is put up in a Thomas splint bent at an angle of 45

degrees. No reaction was observable after quiet reposition. Edema of the foot and leg often results from sling pressure in the popliteal space. Pressure on the external popliteal is to be avoided. The tendency of the upper fragment toward adduction must be corrected by a small padded splint applied to the inner side of the thigh and strapped to the outer bar of the splint. The classical Thomas splint is used in fractures of the middle and upper thirds of the femur. In subtrochanteric fractures displacement in both directions may be extreme. When the lesser trochanter is detached from the main fragment, the displacement does not occur. The upper fragment is quite uncontrollable; therefore the indication is for a Hodgen splint. The important points are to flex the thigh as far as possible and to arrange a sling to bring the upper end of the lower fragment well forward.

Transfixion of the lower fragment just above the condyles can be of great value in these cases.

Wherever possible there is complete control of the lower fragment. In one instance the alignment was only possible by holding the thigh at right angles to the body. The distribution of the external popliteal was secondarily paralyzed in seven cases, all but one clearing up in six weeks, due to sling pressure, usually exerted near the head of the fibula, in two cases near the supracondylar area. These areas should be made as free from pressure as possible. There was one case of pressure palsy of the sciatic nerve. There was one instance in which a progressive painful hematoma formed incident to a shell fragment perforating the femur just above the condyles and lodging in the popliteal artery. Ligation of the popliteal artery and vein was attended by no serious consequences. In 18 cases the main vessel was exposed in the wound; in five of these hemorrhage occurred later. Secondary hemorrhage occurred in seventeen cases, with two deaths, on the average nineteen days after the injury, the shortest period being eight and the longest fifty-one; the bleeding was apparently from minor vessels in eleven cases. The standard treatment is

free exposure of the wound, searching for the bleeding vessel and its occlusion by ligature or forcipressure. If no wound is found, a dry gauze pack of the whole wound track is the only resource.

In secondary operations for sequestra a prophylactic dose of antitetanic serum is given. It is now customary to give a prophylactic dose of serum every fourteen days, while wounds continue to discharge, and in all cases before any operation or manipulation is undertaken. The most rapid consolidation was observed in those cases in which there was most extensive comminution and no infection.

ARTHROTOMY FOLLOWED BY IMMEDIATE CLOSURE OF THE ARTICULATION IN THE TREATMENT OF CERTAIN WOUNDS OF THE KNEE.

GAUDIER and MONTAZ (*Lyon Chir.*, 1917, xiv, 77) state that the immediate suture of the synovial membrane after arthrotomy in knee-joint wounds requires the following conditions: (1) Prompt surgical intervention; (2) complete excision of all injured tissues after extraction of foreign bodies; (3) very careful hemostasis; (4) the possibility of supervision of the patient during the first few days; (5) thorough immobilization.

In a series of fifteen cases reported by the author the average time elapsing between injury and operation was from six to ten hours. In some cases it ran from twenty-four to seventy-two hours. Satisfactory results were obtained in all except one case which became transformed into septic arthritis. Such good results are to be explained by the long period that articular fluid may remain sterile in spite of existing infection of the surrounding tissues and the presence of the bacillus *perfringens* on the projectiles, which fact is known from the researches of Feissinger.

The indications after x-ray examinations are:

Surgical cleansing of all soft parts; ex-

cision of wound edges and injured tissues; thorough hemostasis.

Wide parapatellar arthrotomy, saving the quadriceps tendon if possible.

Very careful cleansing of bone injuries; extraction of the projectile by curette if in the bone; scraping the whole fracture area and smoothing of bone edges.

Lavage of the articular cavity by hexamethylene or ether.

Suture of the synovial membrane by isolating, if possible, the bone injury from the main cavity of the joint. A small plug of gauze is left in the bone cavity and removed after twenty-four hours. In suitable cases there should be suture of the soft parts above the closed synovial membrane, followed by immobilization of the limb.

The evolution is nearly always simple; but there may be a slight rise of temperature during the first days. After two weeks when all inflammatory reaction has vanished, mobilization may be begun.

Contraindications are: Clinical signs of infection; great destruction of soft parts, rendering suture impossible; serious bone injuries calling for primary resection.

In the author's 15 cases, 14 recovered with a movable joint; one recovered with ankylosis.—*Surgery, Gynecology and Obstetrics*, September, 1917.

THE EFFECT OF SUNLIGHT UPON REPAIR OF FRACTURES.

NEUHOF (*Interstate Medical Journal*, August, 1917) conducted a number of laboratory experiments on rabbits exposed to sunlight, being led to this line of work by the brilliant results incident to this form of therapy in cases of open and joint tuberculosis. The rabbits were placed on a roof, receiving the same care and attention. The members of one group were exposed daily to the sunlight, and the other were screened from the sunlight, the screen being arranged to avoid any interference with the air supply. In the specimens from the sunlight animals there was almost invariably a much broader and more vascular zone of activity at the fracture ends, and earlier and

more vigorous osteogenesis between the two fragments. In not a single instance was there greater activity of repair in the control. The controls demonstrated normal repair as ordinarily seen after experimental fracture; the "sunlight" animals presented hyperactivity of repair.

RECENT METHODS OF TRANSFUSION WITH INDICATIONS—TECHNIQUE OF A SODIUM CITRATE METHOD.

GOODRICH (*International Journal of Surgery*, August, 1917) presents a simple method of indirect transfusion which has been used in the Mayo Clinic and in the University Hospital of Augusta.

The instruments necessary for its performance are:

- Two small cambric needles.
- One salvarsan outfit (gravity).
- One 500-Cc. measuring glass.
- One stirring rod (glass).
- Two transfusion needles.
- One tourniquet.
- Normal salt solution.
- Sodium citrate solution, 2 per cent.

A tourniquet is applied to the donor's arm and a suitable vein selected, which is then transfixated with a fine cambric needle. The transfusion needle, which should be a little larger than an ordinary salvarsan needle, is then inserted into the vein just behind the needle and against the blood current, insuring a more rapid flow of blood than if introduced in the opposite direction.

For each 250 Cc. of blood withdrawn 30 Cc. of sodium citrate solution is required to prevent clotting, the solution being poured into the vessel before the blood is allowed to flow. It should be stirred continually with a glass rod until the desired amount is obtained, usually about 500 Cc. The blood thus obtained may be kept for several hours with safety before being used for transfusion.

The vein of the recipient is entered after having been transfixated with the cambric needle, and the blood is then introduced as in administering salvarsan, by the gravity

method. It is well to run in about 20 Cc. of blood and wait for a few minutes (by pinching the tube) to observe how the transfusion is being borne. In the event of anaphylactic shock the operation should be discontinued immediately.

When such a reaction occurs it is usually within the first few minutes after the blood begins to flow. If no reaction manifests itself during this time, it is as a rule safe to proceed, giving the full amount of about 500 Cc. of blood.

PROSTATIC HYPERTROPHY.

SHERWOOD-DUNN (*International Abstract of Surgery*, September, 1917) states that the preparatory treatment is directed particularly toward avoiding such postoperative complications as uremia, infection, pulmonary edema, pelvic cellulitis, infection of the prostatic cavity, phlebitis, and embolism. Considerable significance is paid by Pauchet to his first impression of the clinical risk. If the patient is a thin, wiry subject with the appearance of good resistance he does not hesitate to operate at once. Of particular importance in the preparatory treatment are held forced ingestion of fluids often with the addition of bicarbonate of soda, an exclusive fruit and green vegetable diet, the institution of a general routine massage treatment, and respiratory gymnastics. These respiratory exercises are regarded as of value for the prevention of subsequent pulmonary complications. For the estimation of renal function, Pauchet employs methylene blue and Ambard's constant.

Another factor which Pauchet regards as of value in lowering his mortality is the adoption of the so-called "two-time" technique in selected cases. The patient is submitted to the regulation of fruits, food, and exercise, as described, and in addition the bladder is opened and drained for from one to six months before prostatectomy is performed. This "two-time" procedure he applies to the following classes of cases:

Cases with incontinence and polyuria who have distended bladders.

Cases with marked renal insufficiency.

Cases in which catheterization has been difficult or painful.

Cases of marked clinical risk due to cardiac insufficiency, diabetes, obesity, etc.

Among the points in operative technique, the following details are emphasized:

Do not separate the bladder wall from the cavity of Retzius. Trauma to this region causes pelvic cellulitis.

A complete clean enucleation of the gland must be effected and the cavity left absolutely cleared of all debris. Pauchet considers that in an incomplete or poorly performed operation lies the greatest danger of infection.

The mucous membrane of the bladder and urethra should be severed as cleanly and neatly as possible in order to guard against subsequent stricture.

Pauchet considers that it is necessary to firmly pack the prostatic cavity with a special long single gauze in at least one-third of the cases. This packing is extremely painful and requires morphine.

In feeble subjects Pauchet considers it advisable to sever the vas deferens as a prophylaxis against the development of epididymitis, which in these feeble men often means a fatal termination.

For some time transsacral regional anesthesia has been practiced by Pauchet to the exclusion of all general anesthesia in thin subjects, a presacral in fat ones. Novocaine-adrenalin or novocaine-sur-renine are used.

Crenshaw speaking of postoperative complications notes that they are infectious or non-infectious, but many of the latter group may be due, at least indirectly, to infection.

Wound infection of a severe type is usually avoided if care is taken to have at the time of operation the bladder as clean and as nearly empty as possible; by using interrupted instead of continuous sutures; by leaving all drains undisturbed till the fifth day; and by applying a hot potassium permanganate dressing with the first evidence of redness, pain, or swelling in the wound.

Pyelonephritis, the most frequent compli-

cation, often antedates the operation, and requires preoperative treatment. Prophylactic treatment of postoperative pyelonephritis consists in avoiding septic collections in the wound and bladder, forcing fluids, and administering hexamethylenamine and acid sodium phosphate every four hours.

Epididymitis occurs relatively often, either primarily or secondarily to a previous infection. It is usually unilateral. It is often due to the use of a permanent urethral catheter. Keeping the testicles well supported is the best prophylaxis. During an attack support with moderate pressure, and an ice-bag, if started early, will be all that is necessary. Heat causes more pain and increases suppuration. Although vasectomy may reduce the frequency of epididymitis, it does not preclude it.

Phlebitis is rather infrequent and calls for the usual treatment.

Immediate postoperative hemorrhage can be reduced to a minimum by careful stopping of hemorrhage in the abdominal wound, by sewing the capsule, rubbing the inner surface until it contracts, packing a sponge wrung from boiling water for a

minute, and, lastly, applying a gauze pack or the Hagner bag; finally, by reducing the irrigation to what is necessary to keep the tube free from clots.

Secondary hemorrhage usually occurs from the fourth to the seventh day in patients who otherwise are feeling very well; it is due to the sloughing of prostatic tags. Morphine, an ice-bag, pressure on the perineum and removal of all tubes, and absolute rest, generally will be sufficient. In some cases transfusion may become urgent. Sudden, profuse and dangerous hemorrhage might result from the sloughing through of a large vessel in the prostatic capsule. This would call for immediate reopening of the bladder and packing.

Renal insufficiency is of the acute congestive type with suppression of urine or of the chronic uremic type. In order to have results the diagnosis should be made early.

Points to emphasize are the direct ratio between the local infection and the severity and number of complications; the necessity of early recognition and treatment of complications; the value of specially trained male nurses.

REVIEWS.

GENITO-URINARY SURGERY AND VENEREAL DISEASES. By Edward Martin, A.M., M.D., Benjamin A. Thomas, A.M., M.D., and Stirling W. Moorhead, M.D. Illustrated. Tenth Edition. J. B. Lippincott Company, Philadelphia, 1917. Price \$7.00.

When the first edition of White and Martin's Genito-urinary Surgery appeared, just twenty years ago, it at once took for itself an important place in medical literature. It contained not only the result of large personal experience on the part of both of its authors, but also a complete knowledge of the literature of this ever important subject, and, better still, presented the facts of the subject in such a way that they could be readily grasped and easily utilized by any medical man who possessed sufficient train-

ing to enable him to follow clear directions. Partly owing to the long illness of the senior author, followed by his death, and partly because the junior author felt that the book must be largely rewritten and reillustrated, the appearance of the tenth edition has been delayed.

In addition to the revision of all articles which needed reconsideration, the authors of the tenth edition have given a brief presentation of vaccines and serums, and also of the tests of renal function which are found most valuable in the estimation of operative risks. They have also discussed high-frequency desiccation and laboratory diagnosis of syphilis in its bearings upon the control of treatment. It is interesting

to note that they have not found in practical experience that a continued positive Wassermann reaction is a condition to be heroically combated at the expense of the patient's health, nor do they believe that old syphilitics who have no symptoms should receive either prolonged or continuous treatment with the sole view of altering their Wassermann reaction. On the other hand, they are convinced that intermittent treatment short of producing a reaction should be practiced throughout life, and that mercury and the iodides should be the basis of this treatment. Of very great interest also is their statement that they have not been convinced of either the safety or special usefulness of subdural injections in cerebrospinal syphilis, ataxia, or paresis. Coming at a time when increasing experience seems to indicate that intraspinal injections are not giving the results which at first we hoped for, this expression of opinion on the part of those who have devoted themselves to the study of syphilis possesses more than usual importance.

It has always been a characteristic of this volume that it was copiously illustrated. The present edition contains 422 engravings with 21 colored plates.

Concerning the use of tuberculin as a diagnostic agent, the authors state that the Von Pirquet test merely indicates the presence of a tuberculous focus in the body and does not direct attention to its location. They might have gone a step further and stated that it does not prove the existence at the moment of any active tuberculous process and that its use in adults has little or no value. They do not express any definite opinion as to the value of tuberculin therapy as a remedial measure in the cure of genito-urinary tuberculosis, but they point out that it is a method of treatment which is to be carried out over a very long period of time if it is to be of value. More might have been said with advantage in regard to the employment of antigonococcic serum. Indeed the chapter upon bacterins and serum therapy is so brief as to cause disappointment. We think that a more positive statement of their opinion as to the

value of these measures in different conditions might be made with advantage. This seeming scantiness of information is, however, compensated for to a large extent when the various diseases in which vaccines and serums are employed are discussed. Thus, in considering the complications of gonorrhea, it is said that if antigonococcic serum does not produce an improvement with four to six doses the method should be abandoned as useless, and the statement is made that in gonococcic arthritis treatment by vaccines rather than by serums is more generally resorted to. Recent investigations would seem to indicate that when the serum is employed, or possibly when vaccines are employed, in gonococcic arthritis the advantage gained depends more upon the injection of foreign protein than upon the specific nature of the material injected.

In the nine hundred pages of text an immense amount of valuable information is contained, and the book without doubt will continue to be the leader in this department of medical literature for many years to come.

To the man who wishes to make his tests in his own laboratory the closing pages of the book, in which is described the Wassermann reaction, etc., etc., will prove of particular interest and value. H. A. H.

THE PHYSICIAN'S PERFECT CALL LIST AND RECORD FOR 1918. E. G. Swift, Detroit, Michigan. Price \$1.50.

For many years this excellent call list, whereby the physician is enabled to keep an accurate record of visits which he pays or which are paid to him, has appeared. The list for the year 1918 has been prepared with due care. An addition which is of interest and importance is the space for the record of prescriptions for narcotics as required by the Harrison Act, with information as to what every physician should know about the Act itself. It also contains information such as is usually found in the front of visiting lists, including dose tables, obstetrical tables, equivalents in weights and measures, thermometric scales, and a percentage solution table to which, possibly, the

physician will more frequently turn than any other one of them. There are also facts concerning sick children, methods of diet, and modes of resuscitation. As this is the thirty-second year of its publication it has very evidently met a need. Each book, when delivered, has the name of the physician lettered on it in gold without extra charge.

KIRKES' HANDBOOK OF PHYSIOLOGY. Revised and Rewritten by Charles Wilson Green, A.M., Ph.D. Ninth American Revision, Freely Illustrated. William Wood & Company, New York, 1917. Price \$3.75.

Kirkes' Physiology has been in its field of medical study for many years in much the same class as Gray's Anatomy, the original English edition having found favor both in England and in the United States. Various revisions by English and American physiologists have occurred, just as various revisions or editions of Gray's Anatomy have appeared. The publishers are fortunate in this instance in having called to their aid one who is closely in touch with modern physiology and who is favorably known because of his Manual dealing with experimental pharmacology.

In this ninth edition the chapter on nutrition has been radically revised and now very properly includes the fundamental work of Osborne and Mendel on the food factors necessary for growth, and that of Funk and others on the vitamins and their relationship to nutritional disorders. Many illustrations have been introduced of laboratory experiments designed to make clear and to develop statements in the text which have been revised and rewritten. The editor of this edition is also wise in that he has recognized that the average medical student does not need, and should not have, a book which deals so exclusively with the higher realms of physiology that it seems to have little bearing upon clinical medicine and surgery, for he recognizes clearly that as physiology furnishes the foundation for clinical medicine and surgery, so must a book dealing with this topic show the student that there is a direct relationship between science and theory, and bedside practice.

It is always difficult to revise adequately an old book. We think it likely that if the original author could see this volume he would not recognize it as having any resemblance to the original product of his pen; not that it is inferior, but that it has been so much improved, both in scope and in quality. Kirkes' Physiology to-day is much more complete than it has ever been before, and is a much larger volume than when it appeared in earlier editions.

THE PRACTITIONER'S VISITING LIST FOR 1918. Lea & Febiger, Philadelphia, 1917.

During the many years in which this list has appeared it has been published in four forms: weekly, monthly, perpetual, and for sixty patients per week for a year. All of the last three are undated. For 1918 the weekly dated list has been dropped and the other three continued. The advantage is thought to be that there is no unnecessary space wasted and that the full record of the patient for a month is made upon two pages which face one another, so that instead of the patient's name being entered each week it is only entered once in the month.

The price of the list is \$1.25, and with thumb-letter index \$1.50.

It contains in its early pages information concerning the examination of the urine, equivalent scales, incompatibilities, dose list, and other valuable information.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. By Various Writers. Third Edition, Completely Revised and Rewritten. Edited by Thomas L. Stedman, A.M., M.D. Complete in Eight Volumes. Volume VIII. Freely Illustrated. William Wood & Company, New York, 1917.

As the previous volumes, which go to make up the third edition of what we used to know as Buck's Reference Handbook of Medical Science, have appeared we have called attention to them in words of praise, pointing out that they were not only useful to the individual physician who might possess them, but also that they were a most creditable production in that they reflected honor upon the medical profession of this country, which has not only completed a monumental work, but by the support of

earlier editions has made the last one possible. The present issue, extending from STO-ZYM, and also a general index for the whole eight volumes, cannot be spoken of too highly. A ready reference can be made to almost any subject in the realm of medicine and its collateral sciences, and the editor has been so clever as to see that the treatment of wounds by irrigation with the Carrel apparatus has been gotten into the publication, since while this might appear under "antiseptics," this was impossible because the volume dealing with subjects under the letter "A" appeared long before the Carrel method was known. This important subject is therefore introduced in a brief article at the close of this volume under the alphabetical heading of "Wounds, Antiseptic Irrigation of."

An article, which will prove most interesting to both the surgeon and the physician, is an exhaustive one dealing with the subject of direct and indirect transfusion of blood.

MEDICAL CLINICS OF NORTH AMERICA. W. B. Saunders Company, Philadelphia, 1917. Price per year \$10.

This is No. 2 of Vol. I of these new clinics and is called the "Philadelphia Number" because of the contributions which are made by several Philadelphia clinicians. The volume consists in stenographic reports, or specially prepared reports, of lectures given in various Philadelphia hospitals. As is the case with the "Surgical Clinics" published by the same house, it is designed to make a physician away from large cities feel that he is in close contact with the activities of medical centers.

MEDICAL BACTERIOLOGY. By John A. Roddy, M.D. Illustrated. P. Blakiston's Son & Company, Philadelphia, 1917. Price \$2.50.

Dr. Roddy has prepared the text of this book as the result of his experience as a teacher of medical students, and, as he has devoted a number of years to this work, he is qualified to know what students need. He well points out that bacteriology not only has to deal with the solution of many important problems arising in medicine and

veterinary surgery, but also in agriculture and industry as well, and therefore it is essential that special books dealing with bacteriology should be prepared rather than that this science should be considered, as in many instances heretofore, in text-books of pathology. The author has endeavored to meet the needs of students, practitioners of medicine, pharmacists, and those engaged in foodstuff industries. In other words, his object has been not only to make the book a working manual for the laboratory, but also of assistance in the study of problems which have a commercial bearing.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures, etc. Edited by H. R. M. Landis, M.D. J. B. Lippincott Company, Philadelphia. Price \$2.

This the third volume of International Clinics for the year 1917 contains in its opening pages ten reports of clinics by clinicians in various portions of the United States. Following these there are a number of articles dealing with clinical medicine; two on treatment in connection with tetanus and malignant diphtheria, the latter disease being treated by massive doses of antitoxin given intraperitoneally. After this there is an article upon food inspection in Cincinnati, upon neurasthenia before and after the war, and upon constitutional psychopathy. The closing pages of the present issue contain five articles of a surgical nature, so that the general realm of medicine is pretty well covered.

DISEASES OF THE SKIN. By Richard L. Sutton, M.D. Illustrated. Second Edition, Revised and Enlarged. C. V. Mosby Company, St. Louis, 1917.

This book is very freely illustrated, chiefly in black and white, and by means of eight colored plates. The black-and-white illustrations number 833.

Among the new topics considered we find atrophy of the mucous membrane of the mouth and tongue, atrophy of the fatty layers of the skin, and gangrenous balanitis. There are 140 new illustrations in this edition which did not appear in the old one. Altogether the text covers 987 pages. In other words, it is emphatically one of the

more exhaustive treatises on dermatology. It is excellently printed, the lines being widely spaced, and therefore easily read. Perhaps the most important thing for the general practitioner is the high quality of the illustrations. In some volumes dealing with this subject the illustrations are by no means typical, or, in their reproduction, have lost much of their original value, but this is not true in the book which is before us. The book is a creditable one and will add to the reputation of American dermatology.

WAR SHOCK. By M. D. Eder, B.Sc. Lond., M.R.C.S., L.R.C.D. Lond. P. Blakiston's Son & Co., Philadelphia, 1917. Price \$1.75 net.

The author states that as material for this book he has taken the first 100 consecutive cases of psychoneuroses which came under his care, excluding the psychoses. A certain number of these 100 patients were admitted into the general medical and surgical wards of which he had charge in the earlier stages of the Gallipoli campaign; the larger number were patients who were sent into the special department which was formed later on. There is an appendix giving a summary of the etiology and results of treatment of these first hundred patients. There has been an effort to give so much of the psychology as to make the symptoms intelligible and to show that soldiers suffering from war shock respond peculiarly well to psychiatric treatment. Medical science can reduce the period of suffering to a few days in the vast majority of soldiers suffering from shell shock.

In looking over the contents one will find such headings as Conversion-Hysteria; Psychological Mechanisms in Conversion Hysteria; Anxiety-Hysteria and Psychasthenia. By conversion-hysteria Freud means affections of the senses and locomotion, fits, and so on. Here the mental affection is converted into its physical equivalent.

By anxiety-hysteria is meant the condition of dread, anxiety, fear; this being due to some repressed unconscious mental complex. Psychasthenia corresponds to some extent with Freud's obsessional neurosis,

and with the other psychasthenias which are found among the soldiers; characterized by a total lowering of consciousness produced by obsessions, imperious acts, phobias, and various physical stigmata.

Of 97 cases admitted to treatment, 80 were relieved altogether of their symptoms and 14 improved. Interesting case histories are given. Under Conversion-Hysteria are noted cases exhibiting sensory symptoms such as anesthesia and analgesia, total hemianesthesia, left hemiplegia and complete mutism, contractures, astasia abasia, disorder of speech, aphonia, stammering, amblyopia, deafness, perversions of smell or of taste, tics, twilight state, hysterical vomiting, enuresis, soldier's heart, automimicry, symbolic conversion, symbolic gesture.

Under the Anxiety-Hysteria are the phobias and obsessions. It is noticed that vasomotor disturbances invariably accompany them, causing disturbances of all the physiological systems, the commonest being circulatory, respiratory, intestinal, excretory, and muscular. Under Psychasthenia are included collecting mania, fear contending with desire, dreams.

As to treatment, this is summarized in Suggestion under Hypnotism; Suggestion without Hypnotism; Suggestion under Anesthetic; Psychoanalysis; Other Methods. By suggestion under hypnotism 70 of 79 cases were cured and 7 were improved. By suggestion under anesthetic all six cases were cured.

This book, somewhat cumbered by terminology not familiar to the ordinary reader, is one of fascinating interest and should certainly be read by every army surgeon.

TECHNIQUE OF OPERATIONS OF THE BONES, JOINTS, MUSCLES, AND TENDONS. By Robert Soutter, A.B., M.D. (Harvard). The Macmillan Company, New York, 1917.

This work on a special branch of Surgery, not inapt at the present time, presents a convenient regional classification which facilitates ready reference from the table of contents. The Hip, the Knee, the Foot and Ankle, the Shoulder, the Elbow and the Wrist are successively taken up. There-

after follow chapters upon miscellaneous operations, Plaster and Braces, and a final section on Preparation for Operation.

The first chapter in the Hip section covers briefly and extremely well the Treatment for Congenital Dislocations and Deformities of the Hip. Thereafter are described other operations for partial or total paralysis about this joint, including Arthrodesis and the placing of silk ligaments at the hip for paralysis of the abductors. Incision, puncture, and arthrotomy are also described. Fractures are considered, as is Coxa Vara, Arthroplasty, Osteotomy, and, finally, adjustments of legs of unequal length. Then follows Suppurative Conditions of the Hip-joint and their Appropriate Treatment.

In much the same thorough, practical manner are treated affections of the various large joints of the body.

In this book will be found included not only the teaching sanctioned by long clinical trial and common use, but all that is recent and really valuable in orthopedic surgery. To the general surgeon it is quite as serviceable as to the orthopedist. Its reading is illuminating, its use as a reference will help him in his work. The presentation of the subject shows that skill in selection and clarity of expression which comes only to the trained teacher.

THE PRACTICAL MEDICINE SERIES. Volume III: The Eye, Ear, Nose and Throat. Edited by Casey A. Wood, C.M., M.D., D.C.L.; Albert H. Andrews, M.D.; George E. Shambaugh, M.D. Series 1917. The Year Book Publishers, Chicago.

This excellent brochure opens with an abstract of an article on Visual Standards Used in Medical Examination of Recruits in the British Army and in Continental Armies. There is a small section on Dionin as a Test of Death, a larger section on Headaches of Eye Origin; an abstract of Spiller's excellent article on Tabetic Ocular Crises. There is a final section on Military Surgery of the Eye, one of very great immediate value.

Under the Ear we find such headings as Mechanical Aids to Hearing, Non-Suppurative

Deafness; Prognosis of War Deafness; Notes upon Otitis Media with its Complications.

In the section devoted to the Nose and Throat there is an instructive page on the etiology of common Colds, a valuable paper concerning their infective nature being abstracted. Hay Fever receives brief but skilled attention. There is a picture of a tonsil microscope, with a description of the pictures obtained by this ingenious instrument.

As is natural suitable space is devoted to tonsillectomy with its complications.

The book is an excellent summary of valuable current literature on the subjects to which it is devoted.

NOTES AND QUERIES.

RULES AGAINST NURSE-ANESTHETISTS.

The *Ohio State Medical Journal* of September 1, 1917, states that the giving of various drugs to produce anesthesia when surgical operations are being performed constitutes the practice of medicine, under the provisions of the medical laws of Ohio. It is, therefore, illegal for a nurse or any person other than a licensed physician to administer an anesthetic in Ohio.

This opinion, which confirms a similar opinion rendered by Attorney-General Hogan in 1911, was handed down August 14 by Attorney-General Joseph McGhee. It is issued to Mr. Howell Wright, member of the Senate from the Cleveland district, who is also secretary of the Cleveland Hospital Council. Mr. Wright authorizes the statement that this opinion will be contested in the courts, and that very shortly the Supreme Court of Ohio will be asked to pass upon the question as to whether a nurse, acting under the direction of a surgeon, may administer an anesthetic. Undoubtedly the case will be bitterly fought, as the organized anesthetists will seek to have the court sustain Mr. McGhee's ruling.

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